Coal Age

NOVEMBER, 1954

A McGRAW-HILL PUBLICATION—PRICE 50c

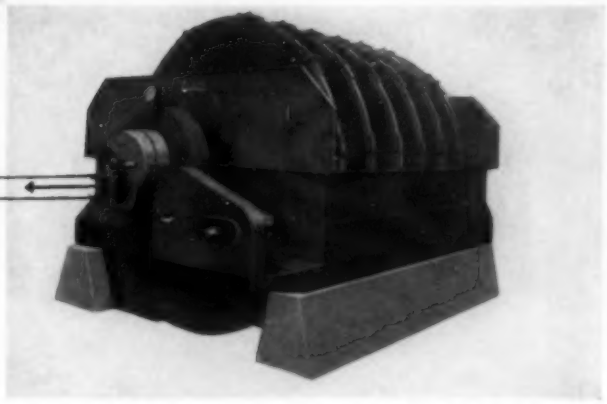
Coal Resurgent: A Look at Coal Today . . . . . p 70

Big Chief Gets Set for Top Efficiency. . . . . p 74

Operating Report: P & M's Newest Mine . . . pp 80-91

Coal Dewaterers...

that keep fines out of the filtrate



Do you want to re-use the wash water coming from your coal preparation plant? Then, fines 'build up' becomes a problem, including the added maintenance burden on the recirculating pumps resulting from excessive solids.

The answer is simple. Install a dewaterer that retains the fines . . . that delivers a re-usable filtrate carrying less than 1% solids, a manageable quantity . . . install either the Oliver Horizontal Filter or the American Disc Type Filter or both as a team with a classifier to separate coarse from fines in the feed. Both of these filters are excellent dewaterers with exceptionally high capacity. Because they separate solids from liquids by means of a filter cloth, they produce practically clear filtrate.

We have made a thorough study of coal dewatering problems . . . have made countless tests . . . and have operating data from numerous installations to show what can be done in the way of taking coal fines out of the plant effluent, leaving it so clear that it is completely re-usable. Why not let Oliver United Engineers make a study of your 'fines-handling' problem?

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OLIVER UNITED FILTERS OUF INC.

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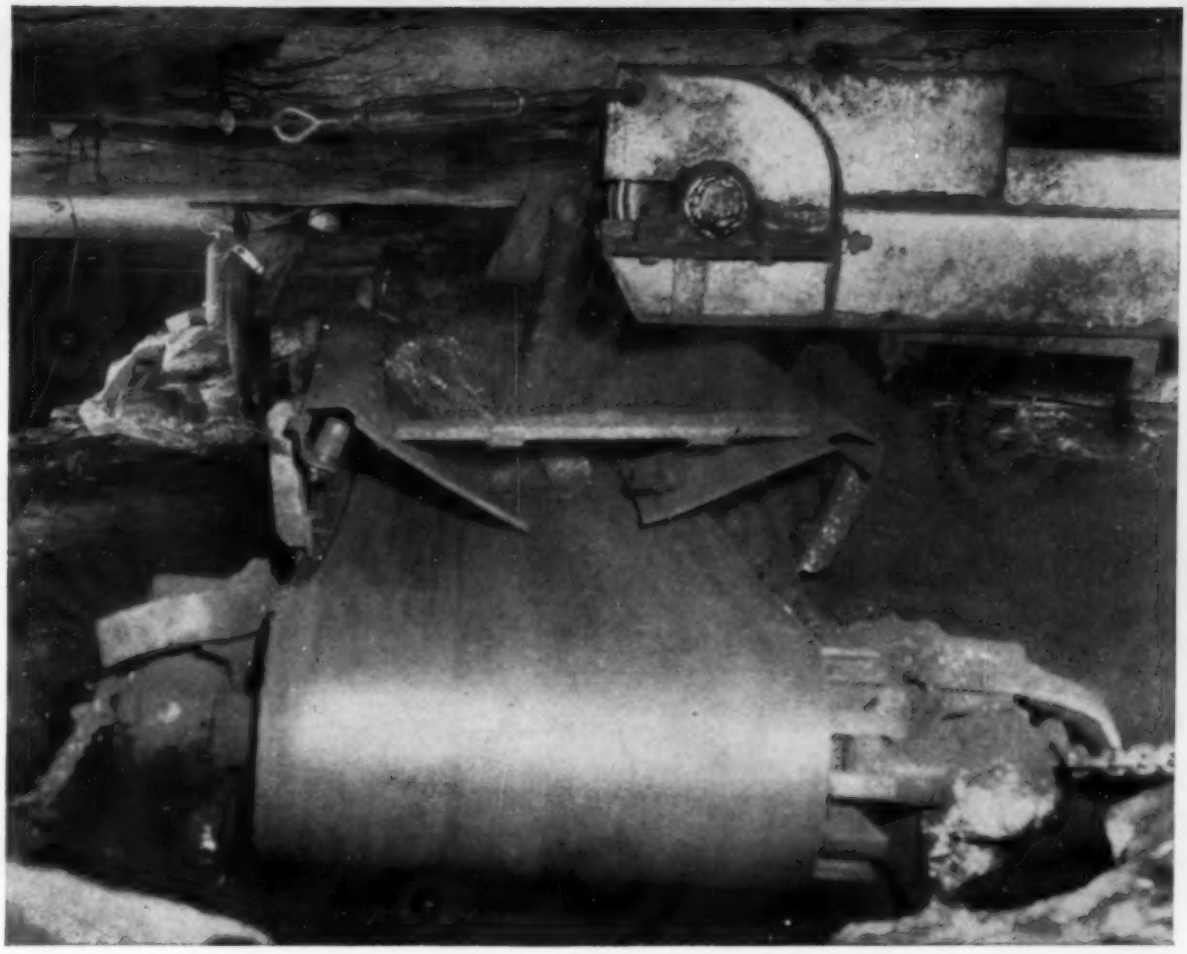
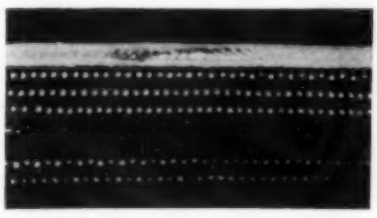
RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Mildew-resisting cord belt lasts 2½ times longer in "wet" mine

THAT belt has just run through water on its return from hauling chunks of coal to the mine railway. Wet operations like this cause mildew which quickly spreads across ordinary belts weakening them to the breaking point. There are two reasons why this can't happen to a B. F. Goodrich cord belt.



In this B. F. Goodrich belt there are plies of parallel cords, running lengthwise, built into both the top and bottom of the belt. Each cord is completely surrounded by rubber—no cross threads tie them together (see cross section). A cut in belt admits moisture or damaging acid to only those few cords exposed. There are no cross cords to wick moisture across belt width. No other conveyor belts are made like this.

As an added protection, B. F. Goodrich cord belts are treated with mildew inhibitors. These chemicals act directly on fungus spores, effectively protect belts against mildew.

That's why the B. F. Goodrich belt in the picture was chosen by the mine operators. And it has paid off. The belt has carried 3½ million tons over an 11 year period. Other belts on this same job lasted only 4 years.

If exposure to moisture and mine acids is shortening the life of your coal-handling belts, you need a B. F. Goodrich *cord* belt. Let your BFG distributor show you how these longer-lasting conveyor belts can save you money. *The B. F. Goodrich Company, Dept. M-329, Akron 18, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

Introducing Another

HULBURT A.P. GREASES made

Hulburt's skill in quality grease making, combined with Du Pont's new chemical discovery, Estersil GT, produce the LONG LASTING...

Red Grease

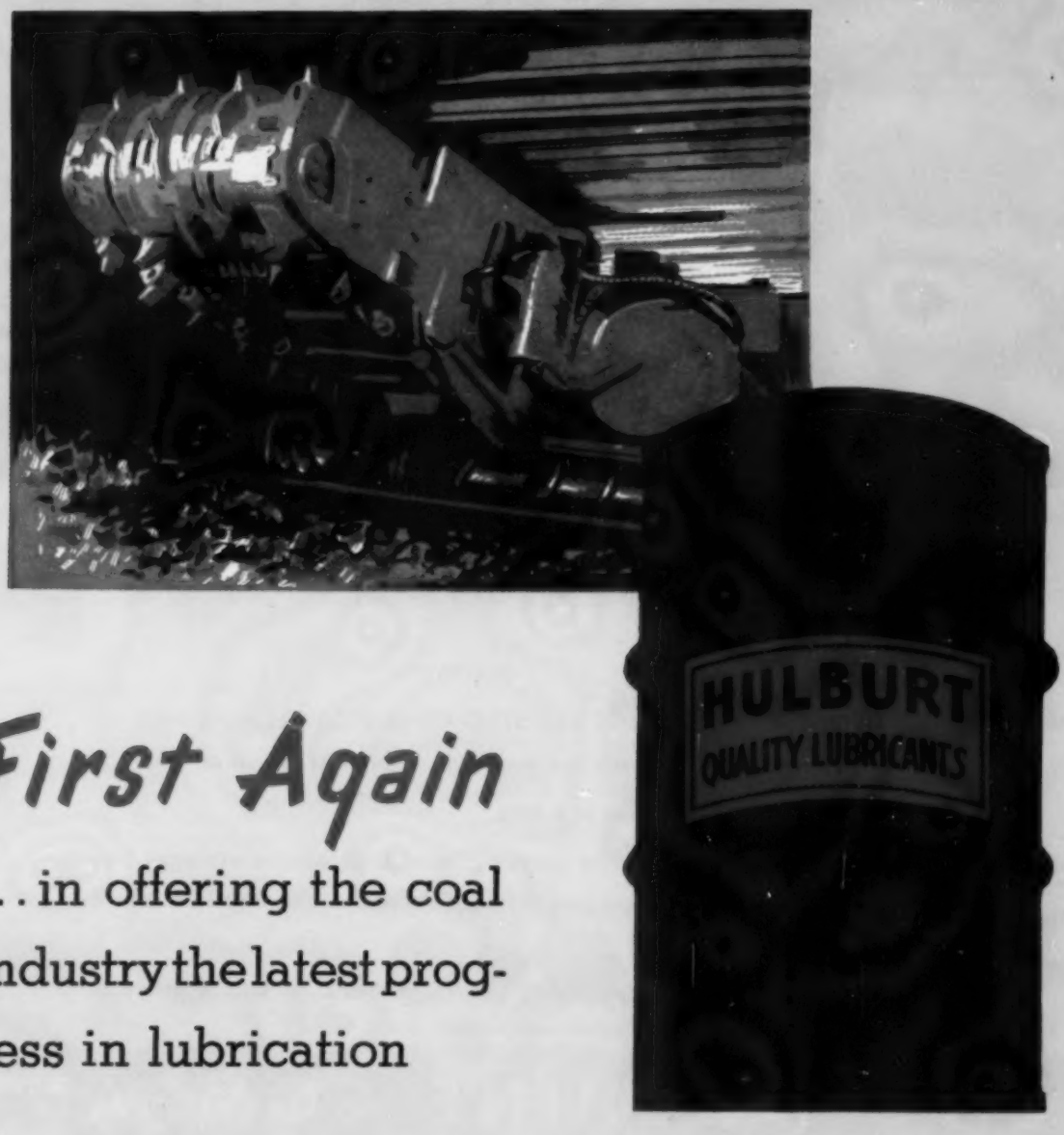
Red Grease has no melting point

Red Grease is completely water resistant

Red Grease has phenomenal working stability

Hulburt First...

with Du Pont ESTERSIL GT



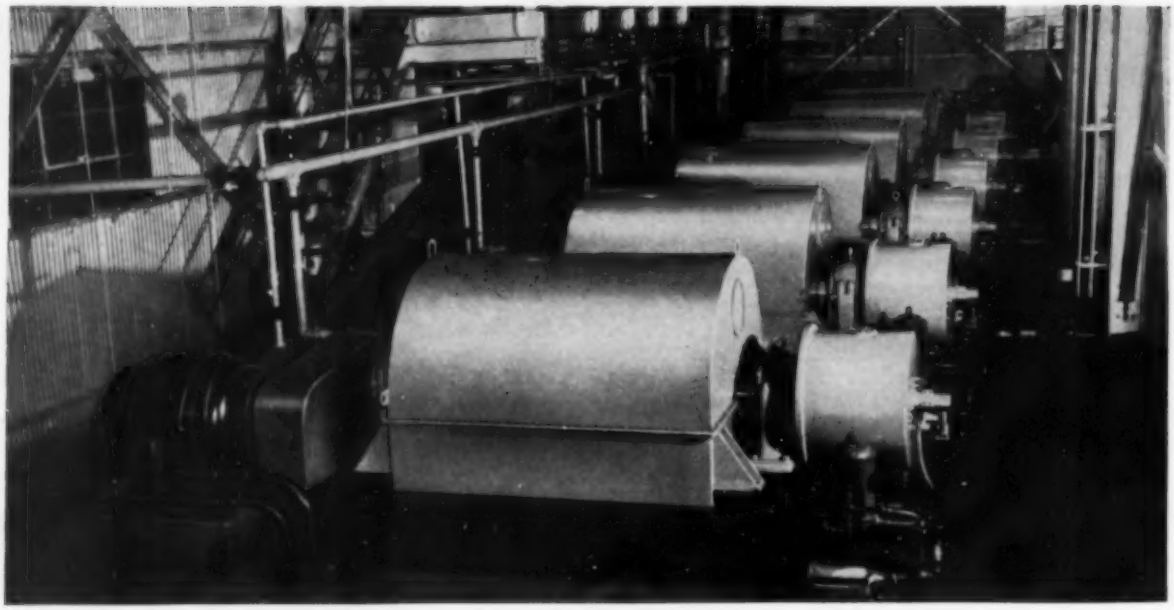
First Again

...in offering the coal industry the latest progress in lubrication

HULBURT OIL & GREASE COMPANY, PHILADELPHIA, PA.

Specialists in Coal Mine Lubrication

CLEAN ANSWER TO A DIRTY PROBLEM



THE PROBLEM: How to take the water out of washed fine coal and do it efficiently, economically and continuously at minimum cost per ton.

THE ANSWER: The BIRD COAL FILTER. It recovers all of the fine coal and takes out the maximum amount of moisture.

It runs non-stop for months at a time.

It does the job for about five cents per ton. Maintenance averages less than two cents a ton. It soon pays for itself out of these savings in running expense.

It is the one best bet for dewatering your ⅜" x 0 coal. Ask us to prove it.

BIRD MACHINE COMPANY
SOUTH WALPOLE • MASSACHUSETTS

Coal Age

NOVEMBER • 1954

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Norfolk & Western Story

STAUNCH COAL SUPPORTER and active industry booster for many years—that's the record of the Norfolk & Western Ry., which *Coal Age* will cover in its December lead-off feature article. Originally built to open up new coal areas, the N&W has long maintained that the modern coal-fired locomotive is the equal of the diesel any day, has been one of the few major railroads to resist dieselization. Along with the N&W's history and the reasons behind its policy, this staff-written report will give you a preview of the N&W's newest development, a highly efficient coal-fired steam-turbine electro-drive locomotive that is the largest single-unit locomotive in the world.

Also Ahead in Coal Age

An average shift output of 400 tons with a continuous miner, a maintenance program that eliminated armature failures for the past 6 yr and real management-labor teamwork are among the ways Pecks Run Coal Co. figures "to keep one step ahead."

Stripping in cramped quarters, with medium-capacity stripping machines feeding bulldozers for final spoiling, has proved to be an economical method of mining for William Piccolomini, in the Pennsylvania bituminous field.

How to stop stream polution from cleaning plants, a discussion of the methods available and how they can be used effectively in open and closed circuits.

Modern mine communication, details of a system that has provided Cannelton Coal & Coke with complete communication coverage at minimum installation cost.

Fire-retardant coatings for mines, what they are, what they do and how to use them to reduce mining hazards.

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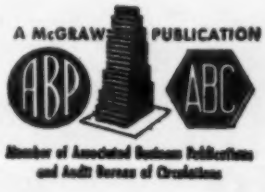

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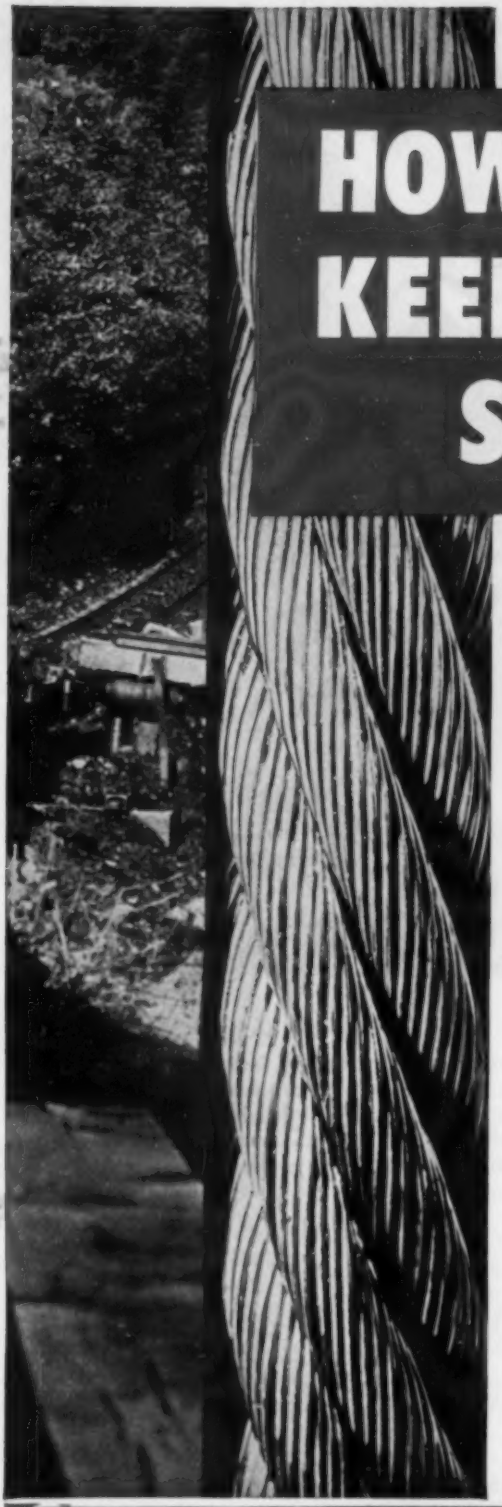
TEXACO



HOW MARY HELEN KEEPS WIRE ROPE STRONG . . .

FROM MARY HELEN Coal Corporation, Coalgood, Kentucky, comes this interesting proof that *Texaco Crater* keeps wire rope strong longer. Electrician Oliver Robbins tells the story:

> ***"We have a 3,100-foot Bethlehem wire rope used to lower loaded coal cars from an upper seam to a level where they can be pulled by locomotive to the tipple. Four cars weighing 8½ tons, and containing about three and a half tons each, are handled at a time. The rope has been lubricated exclusively with Texaco Crater — conveniently sprayed on when the hoist is in operation.***
>
> ***"After some two years' service and over 225,000 tons of coal had been lowered, we sent a sample of the rope to the manufacturer for testing. The report on the test showed the rope to be perfectly lubricated and to have more tensile strength than guaranteed when sold to us. We shall certainly keep on using Texaco Crater."***

This case is typical. *Texaco Crater* is the *penetrating* wire rope lubricant that gives long-lasting protection to both strands and core. It is also ideal for open gears, assuring smoother operation, longer gear life. For greater application convenience, many operators prefer *Texaco Crater X fluid.* It *goes* on as a liquid, *stays* on as a tough, tenacious lubricating film.

Other Texaco Lubricants used in the Mary Helen Mine include: *Texaco Olympian Grease,* used in mine car wheels to assure easier starts and greater protection; *Texaco Regal Starfak* for high-speed anti-friction bearings; and *Texaco Regal Oil R&O* to keep hydraulic systems free from rust, sludge and foam.

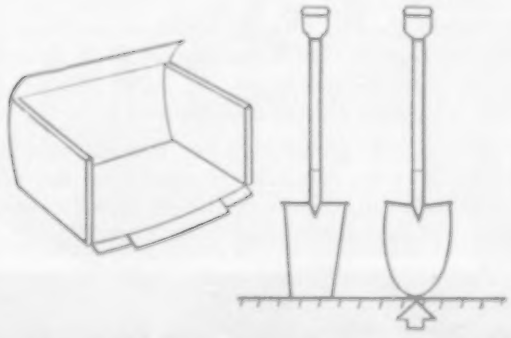
Let a Texaco Lubrication Engineer help you increase efficiency and reduce maintenance costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICANTS for the Coal Mining Industry

Compare these dirt-

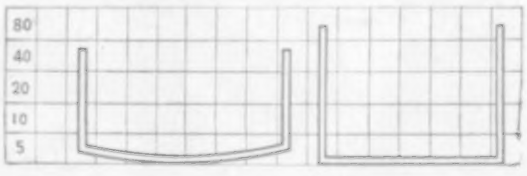
PENETRATES FASTER

Curved and offset cutting edge on Allis-Chalmers Motor Scrapers concentrates all the horsepower on the center section during initial penetration. The penetrating ability of a round-end spade helps illustrate the practical soundness of this Allis-Chalmers design.



LOADS FASTER

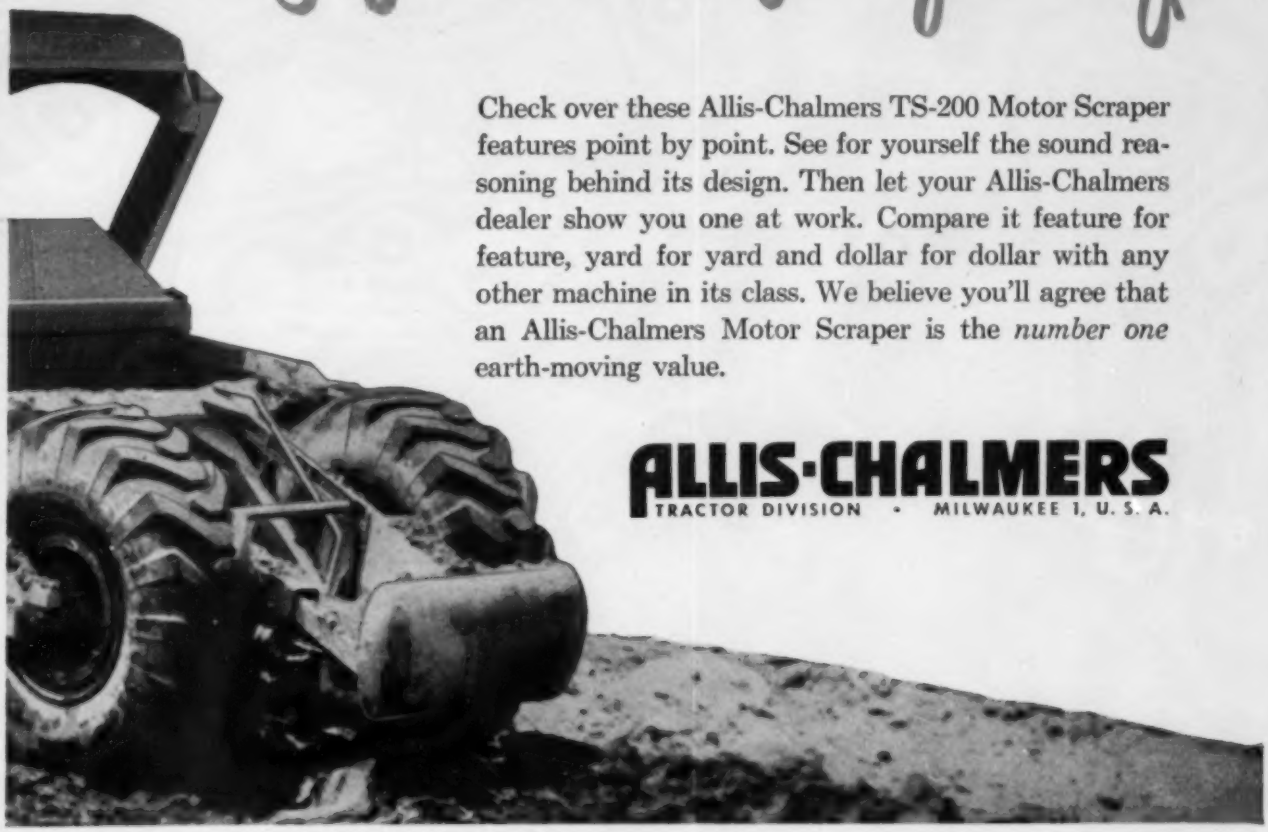
Low, wide bowl plays an extremely important part in ease of loading. Tests have proved that loading resistance is largely determined by the height to which the load is built. New dirt entering the bowl must lift the load directly above it in order to make room for itself.



This chart shows how loading resistance continually increases as the load builds up . . . how the lower, wider bowl of an Allis-Chalmers Motor Scraper requires less time and power to get the same yardage.

PERFORMANCE MAKES DOLLARS

· moving features before you buy

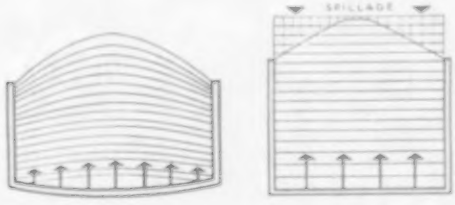


Check over these Allis-Chalmers TS-200 Motor Scraper features point by point. See for yourself the sound reasoning behind its design. Then let your Allis-Chalmers dealer show you one at work. Compare it feature for feature, yard for yard and dollar for dollar with any other machine in its class. We believe you'll agree that an Allis-Chalmers Motor Scraper is the *number one* earth-moving value.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

HEAPS AUTOMATICALLY

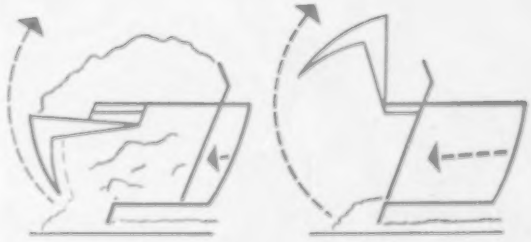
The combination of slightly deeper center cut and correctly angled cutting edge shapes the load as the scraper fills. The greater volume of dirt flowing into the center of the bowl "boils" forward, to the rear and to the sides, producing an automatically heaped load without excessive spillage.



These diagrams show how an automatically heaped load avoids costly spillage even though the center is built up above the sides of the bowl.

SPREADS EVENLY

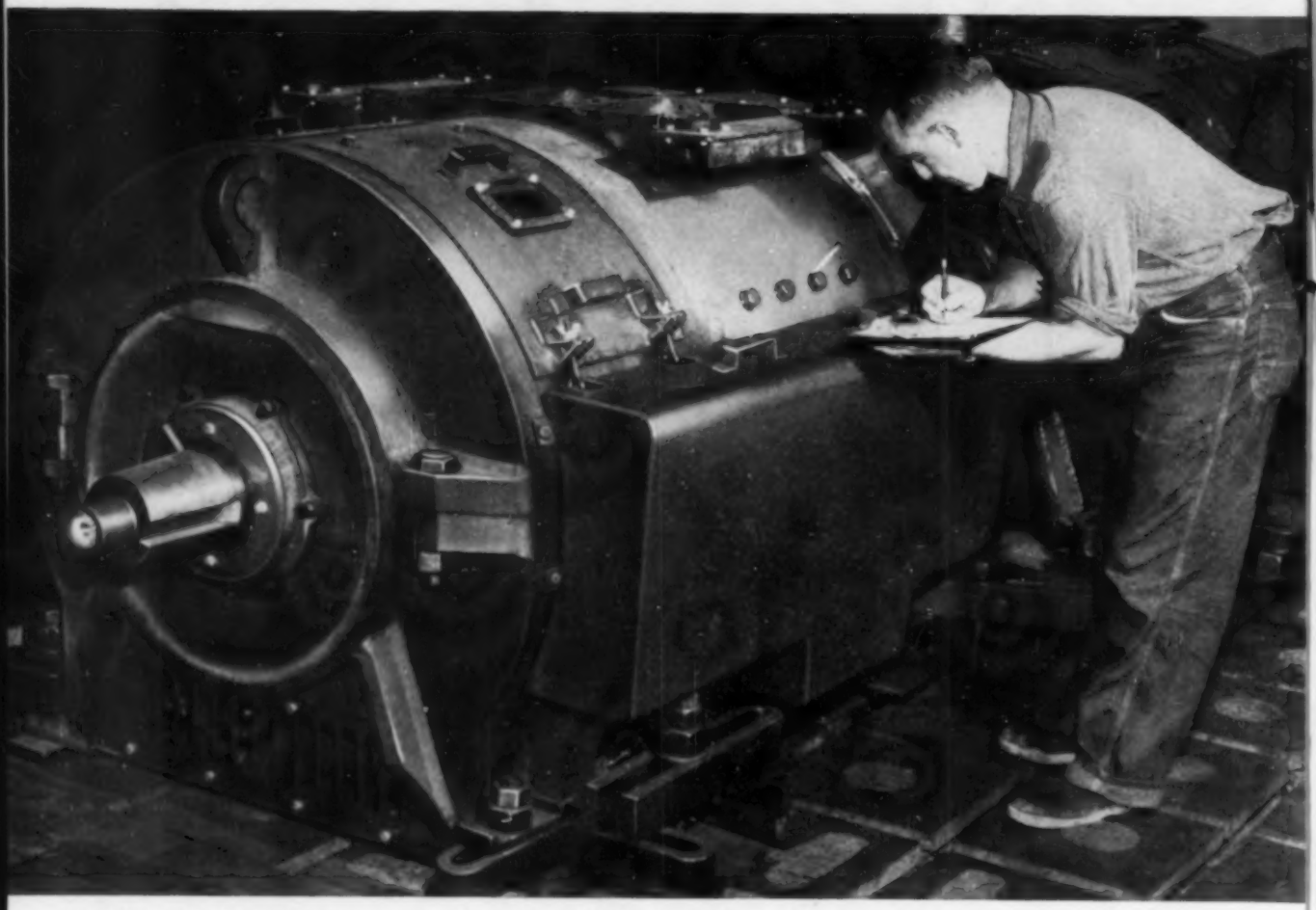
Forward movement of ejector is timed with lifting action of apron, which provides a continuous flow of material to insure a smooth, even spread.



High apron lift prevents any possibility of material's jamming. Even when loaded from overhead, anything that can be put into the bowl can be easily ejected.

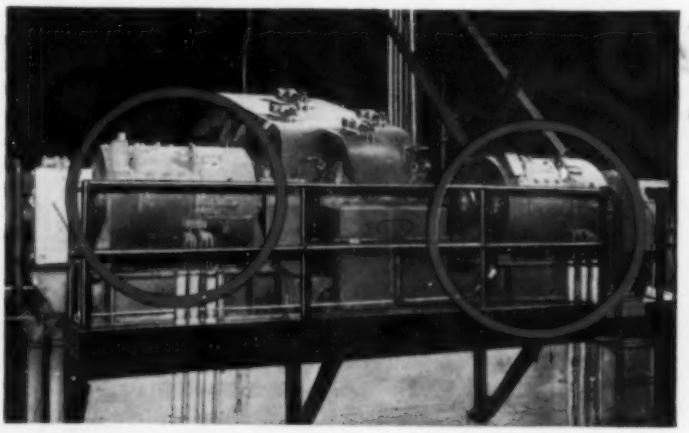
WHEN DESIGN MAKES SENSE

NEW G-E Armored Mill Motor—



TO ASSURE YOU of dependable service, this MD-622 is undergoing the rigid tests given to all G-E Armored Motors before shipment.

POWER SHOVEL equipped with compact G-E Type MD motors which have high overload capacity and the ability to take the terrific shocks of excavating duty.



SLAB SHEAR in reversing, blooming and slabbing mill is typical of severe applications in the steel industry that are dependably powered by G-E armored motors.

Most Powerful in its Class

Another G-E "first"—the MD-622—gives you more horsepower and torque than any other mill motor!

POWER-PLUS for the toughest heavy-duty application—that's the job of the MD-622—General Electric's latest addition to the MD-600 Armored Motor line.

AISE OBJECTIVES set up for smaller motors of this type, are met in the construction of the MD-622, which gives you more horsepower, increased commutating ability and better speed regulation in the same mounting dimensions as the earlier motor. Designed for duty in steel mills, power shovels, mine operations, dredges and ore bridges, it's ideal for extra torque, high momentary loads and snappy reversals.

RATED 500 HP AT 350 RPM when force ventilated, this motor delivers more torque relative to its size than any other mill motor ever built.

BETTER SPEED REGULATION can be maintained at higher speeds than in previous motors—and maximum safe speed is 20% higher.

WIDER SPEED RANGE is possible with the adjustable speed MD-622 and stabilizing series windings are not required, simplifying control on reversing operations.

REDUCED MAINTENANCE due to integral feet on armature. Out of frame, it stands by itself. Armature spider allows replacement of shaft without disturbing windings.

FOR NEW BULLETIN on MD-600 motors, fill out the coupon below. If you need more information, contact your nearest G-E Apparatus Sales Office. General Electric Co., Schenectady 5, N. Y.

Please send Bulletin GEA-4654C, "DC Armored Motors," which gives the complete story on the MD-600 line with examples of their reliable performance throughout industry.

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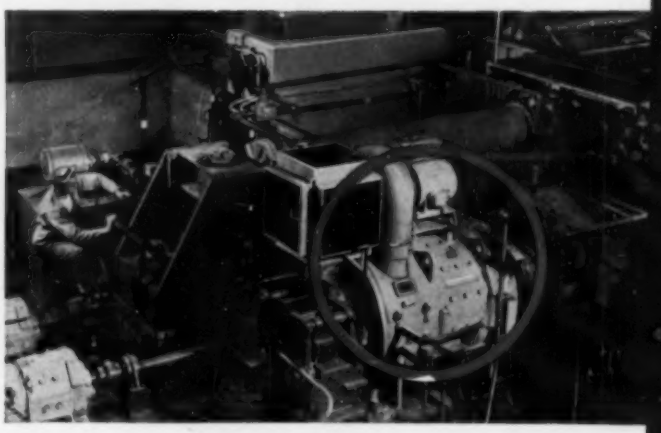
DRAGLINE powered by amplidyne-controlled G-E armored motors—which were selected because of their high torque and quick reversing characteristics.



COILER in hot strip mill driven by force ventilated G-E armored motor with extra horsepower and mechanical strength to withstand severe operating conditions.

KNOW THE BOTTOM DUMPING CARS YOU BUY

EACH *S-D AUTOMATIC* GIVES YOU 1/4 TO 1/2 TON MORE CAPACITY FOR THE SAME OVERALL DIMENSIONS

THIS EXTRA CAPACITY is available only in S-D Automatics because of the construction features of Sanford-Day's exclusive S-D Automatic design. If you were buying, for example, 16 bottom dumping cars of any other make with a 4-ton level full capacity, you would need only 14 S-D Automatics of the same overall dimensions to haul the same tonnage. You would save two cars in every 16 . . . 12½ percent in original investment . . . 12½ percent in maintenance . . . 12½ percent less dead weight to haul. Any one of our sales engineers will demonstrate to your complete satisfaction just how we are able to give you this extra capacity.

You should know, too, before buying cars, that extra capacity is just one advantage of S-D Automatics. Others include: (1) the S-D "Twin Safety Latches" . . . two latches for safe and sure latching that are tripped simultaneously by the independently operated pair of tripping devices mounted between rails at bin. (2) The only bottom dumping car completely sealed against dust leakage. This big improvement gives you safer operation by preventing leakage of dust and enables you to eliminate the major portion of track clean-up costs. Let one of our men give you the full story. Write or call us today. *Sanford-Day Iron Works, Inc., P. O. Box 1511, Knoxville, Tenn. Telephone 3-4191.*

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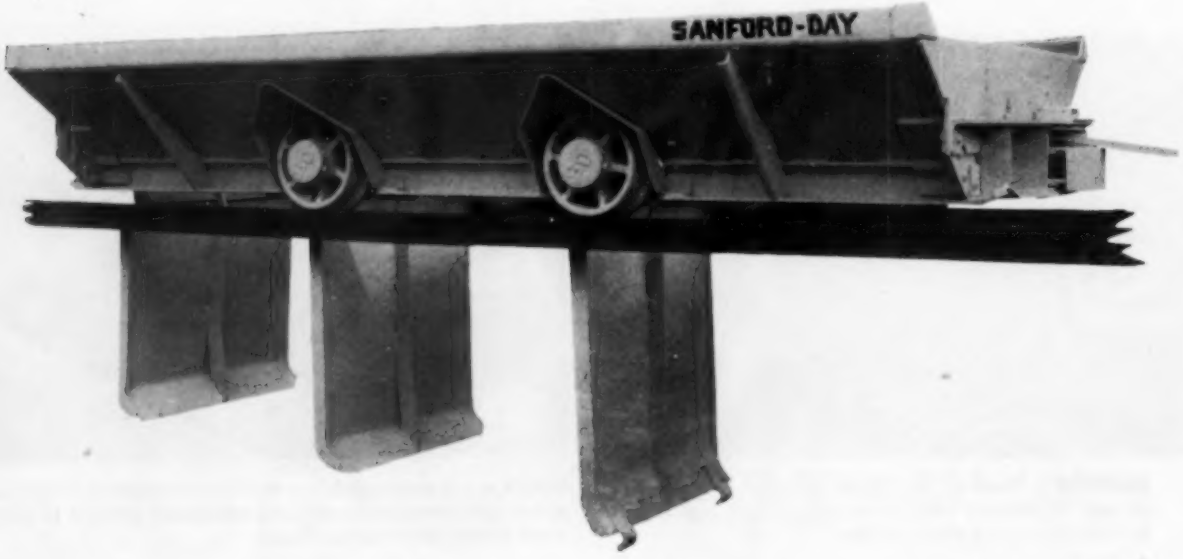


A PAIR FOR PROFIT

IN LOW COAL!

Goodman

TYPE 870 SHUTTLE CAR

- basic height, 26"
- capacity, water level, full, 94 cu. ft.
- 4-wheel power steering, 4-wheel disc type brakes, 4-wheel drive, adjustable height discharge, hydraulic cable reel

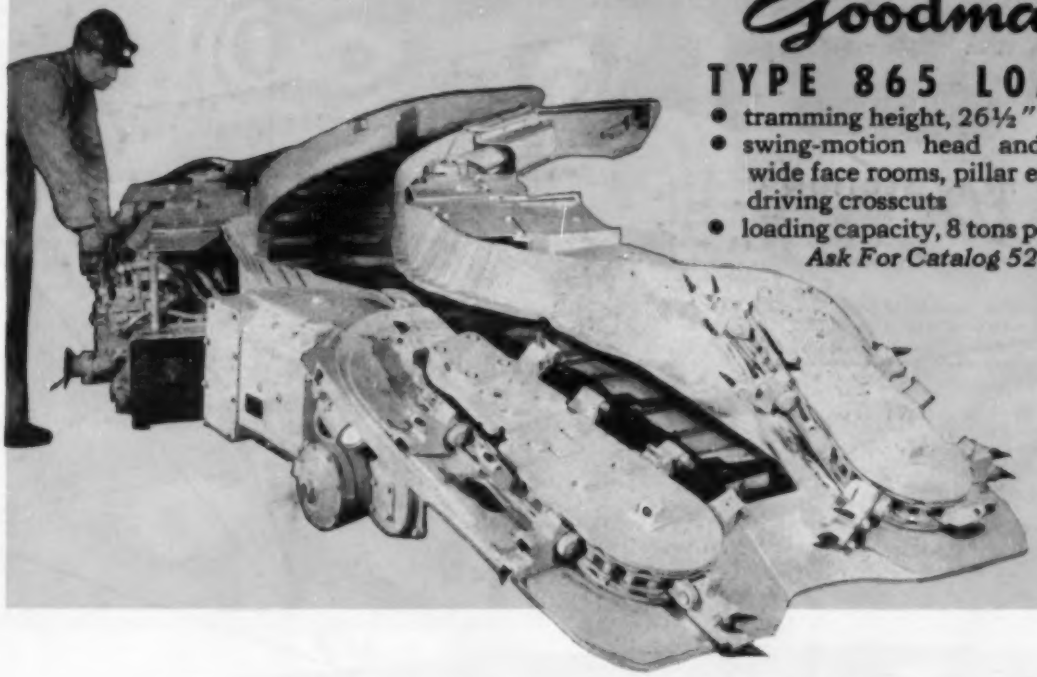
Ask For Catalog 5411

Goodman

TYPE 865 LOADER

- tramming height, 26½"
- swing-motion head and tail for wide face rooms, pillar extraction, driving crosscuts
- loading capacity, 8 tons per minute

Ask For Catalog 524



Goodman builds a complete line of loaders and shuttle cars for trackless mining. See this equipment in action for proof of ability to produce high tonnages. A Goodman sales engineer will be glad to arrange a mine visit.

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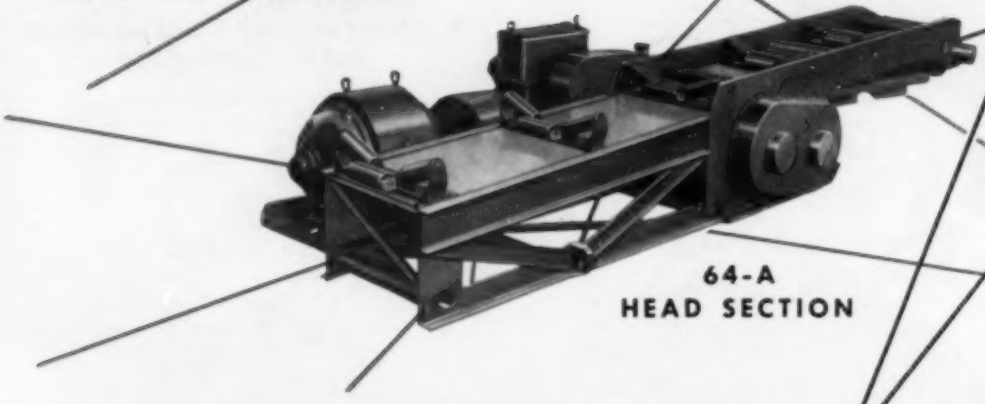
HALSTED STREET at 48th · CHICAGO 9, ILLINOIS

Cutting Machines • Conveyors • Loaders • Shuttle Cars • Locomotives • Continuous Miners

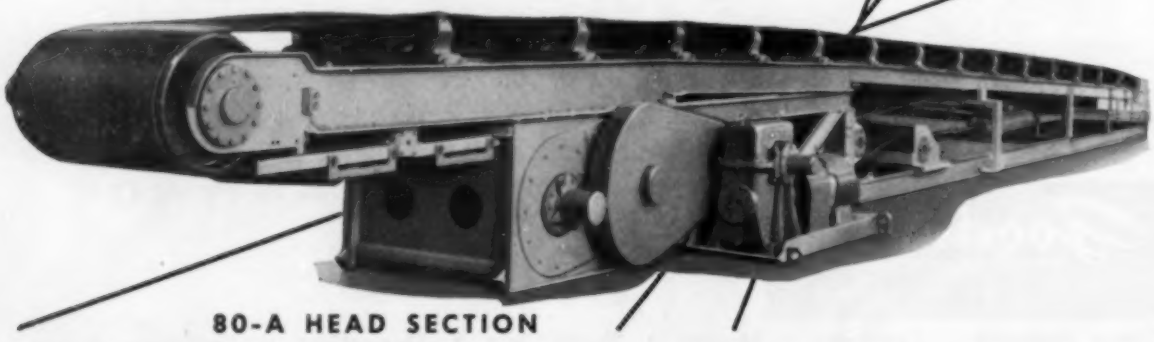
three heads...three frames...

choose the exact belt conveyor for your mine from the complete JEFFREY line

52-B HEAD SECTION



64-A
HEAD SECTION



80-A HEAD SECTION

52-B FRAME

64-A FRAME

80-A FRAME

No two belt conveyor problems are quite alike—but Jeffrey units can solve all of them. With three types of sturdy head sections and three types of rugged frames—you have a selection of nine combinations to cut handling costs. Our engineers will help you select the *right* one for each gathering, slope or main line haulage job.

The three husky head sections—52-B, 64-A and 80-A—can transmit from 25 to 160 HP for belt speeds from 150 to 600 FPM. Tandem drive puts the conveyor belt in maximum contact with two gear-meshed drive pulleys for most efficient use of power on a long pull. For shorter hauls and where frequent moves are necessary, the lighter weight 52-H head unit with a single drive pulley is available.

The three frames—52-B, 64-A and 80-A—are built for belt widths from 26" to 48" and an idler roll size range from 2-9/16" to 6" dia. The wide variety of belt widths and idler roll sizes multiplies many times the nine basic types mentioned above, to give the widest possible choice of belt conveyors—of which *one* is suited to your *exact* needs.

Call on Jeffrey for underground belt conveyors. Jeffrey will specify the one correct head section for the power required and the one correct frame for the size and weight of material, the available height, frequency of changes in location, belt speed required and feeding arrangement. You are assured of high-tonnage handling at low cost, less "down time" and low maintenance. The flexibility and range of Jeffrey mine belt conveyors are unequaled—so is the quality that has made Jeffrey mine equipment famous for 77 years.

52-B Head section can be driven with a 25 to 75 HP motor and is arranged so drive can be mounted on either side. The light, portable, knockdown frames are made for 26", 30" and 36" belts, and idler rolls of 2 9/16" and 4" can be furnished. Sections are bolted at installation for rigidity and come apart in conveniently handled components for easy transfer in low coal.

64-A For medium duty gathering or haulage, Jeffrey offers the 64-A head section and frame. At higher speeds, motors up to 125 HP can be used, and the head unit comes apart in three sections for easy moving. Frames are the knockdown pan type with dowl pin couplings, and they can be built to accommodate belt widths of 30", 36" and 42", with 4" dia. idler rolls.

80-A Head section and frame are especially designed for high speed, high tonnage and heavy duty in coal mines where the main haulage system is a semi-permanent or permanent installation. The head section is built for motor drives up to 160 HP and provides belt speeds up to 600 FPM. The frame is adaptable to 30", 36", 42" and 48" belts and 4", 5" or 6" dia. idler rolls. The 80-A frame permits a choice from a variety of standard idlers, including the new Jeffrey idler with double flexible contact seals.

Planning on replacement or modernization of parts of your present belt conveyors? No matter what the make, Jeffrey can supply Head Sections, Power Units, Tail Sections, Intermediate Sections, Idlers, Impact Idlers, Loading Stations with Impact Idlers, Horizontal Pneumatic Takeups and Speed Responsive Switches. Let us quote on these units!

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED . . . IT'S A JOB FOR JEFFREY!

No other

the JOY LIMBEROLLER

(PAT. APPLIED FOR)

has everything you want for coal haulage

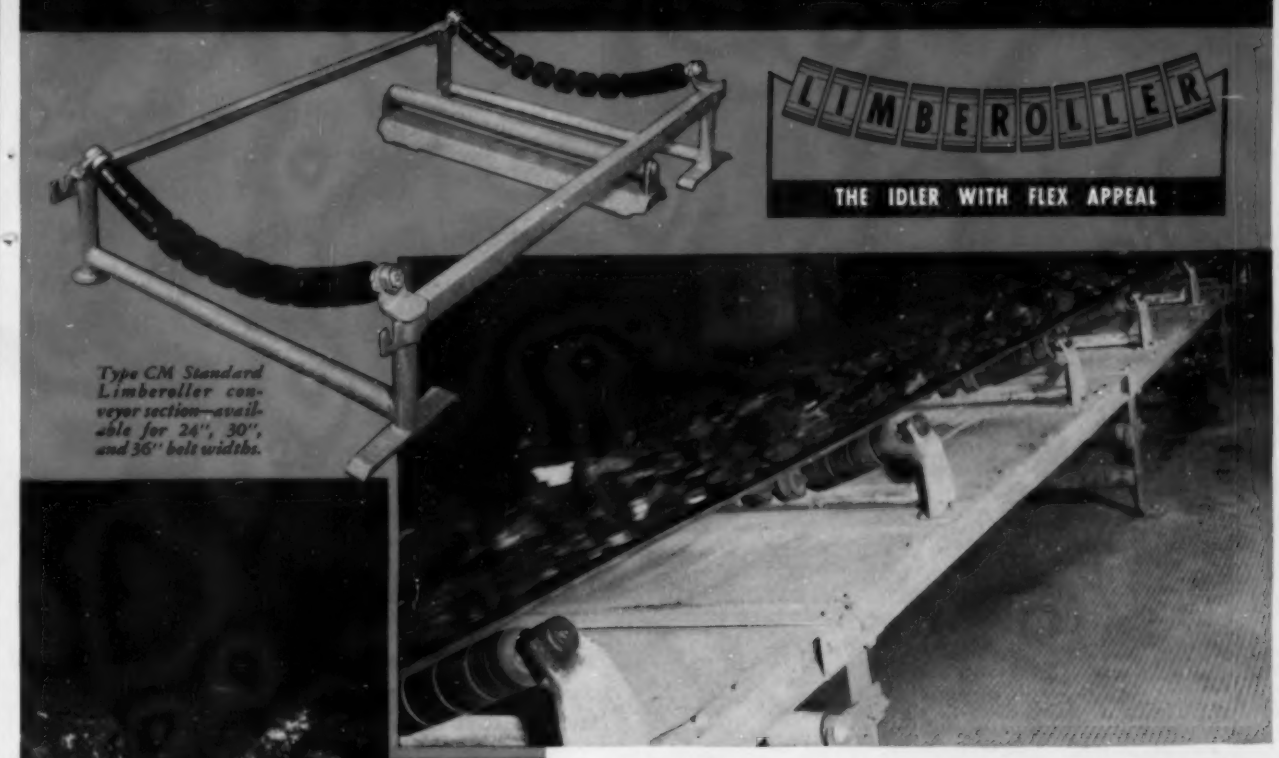
UNDERGROUND . . . *the Joy Limberoller weighs 2/3 less than a steel idler. Neither the CM (standard) or CL (low) stands require bolts or cover sheets; there are fewer parts and less weight to handle than with any other conveyor.*

IN LOW COAL . . . *with the CL stand (1 ft) the Limberoller provides a lower conveyor system than any other available. Now you can have the efficiency of belt haulage in tight locations where it was never before possible.*

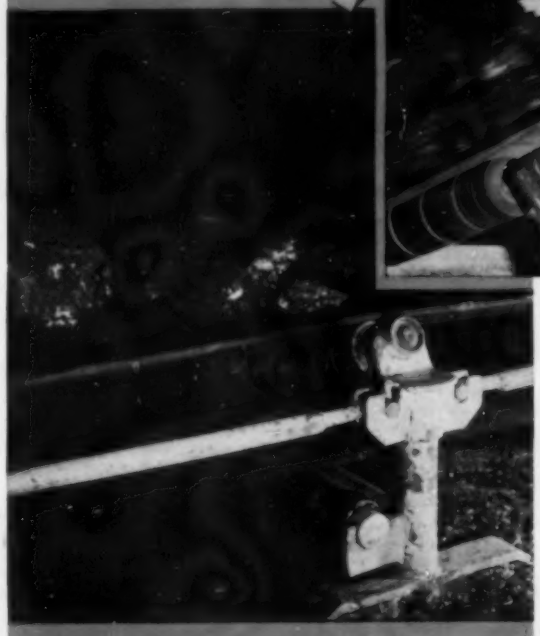
even comes close!

LIMBEROLLER

THE IDLER WITH FLEX APPEAL



Type CM Standard Limberoller conveyor section—available for 24", 30", and 36" belt widths.



ABOVE GROUND . . . *Limberoller idlers can be used anywhere around the mine. Above, in use in the tipple, mounted on type HM stands which have brackets for bolting to conventional conveyor sections.*

With the unique Limberoller Idler, Joy again leads in pointing the way to reducing your costs and protecting your profit margin. Here is a field-proved and foolproof belt idler that is self-conforming and self-cleaning—resists corrosion, abrasion and flame—reduces belt wear and prolongs its life. The simple, rugged design of a Limberoller conveyor system makes it easier, faster and less costly to install and maintain—to set up, knock down and move—than any other conveyor available. ● Let us figure on *your* needs! ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario*

The Limberoller consists of a series of pressure-molded neoprene discs, molded to a neoprene-sheathed, flexible steel cable. The cable is freely suspended from two cadmium-plated, precision-type, double-row ball bearings. Bearings are supported above and to each side of the belt, out of the dirt zone. They simply drop in place and are locked with spring clips—can be changed or new stands added while belt is loaded and moving.

Write for Bulletin LD-103, or

Consult a Joy Engineer

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

Increase your footage

Use CLEVELAND Air Legs and Drills...the easiest way

THE FEED YOU NEED — FROM ZERO FEED TO FULL LINE

Eleven detent positions enable drill operator to set and maintain pressures in a range from zero to full-line feeding pressure — with an increase of 9 psi at each setting. That's why a CLEVELAND Air Leg and H10AL Drill combination gives top performance in any kind of rock.

Shown here is a **CLEVELAND AL-92** Telescopic Air Leg with H10AL Drill. Because of space limitations, full length isn't shown.

CLEVELAND AL-92 Telescopic Air Leg with H10AL Drill and exclusive 11-position feed control

SPECIFICATIONS

Standard, automatic controlled wet-type backhead.

Chuck Sizes	7/8" x 4 1/4" — or other popular steel shank sizes	
Weight, Drill	60 lbs.	
Air Hose	3/4"	
Water Hose	1/2"	
Full Feed Travel	4'	6'
Collapsed Feed	2' ea. piston	3' ea. piston
Closed Length	48"	60"
Extended Length	96"	132"
Air Leg Weight	37 lbs.	42 lbs.

CLEVELAND AL-90 Single Extension Air Leg for use with H10AL Drill and exclusive 11-position feed control

SPECIFICATIONS

Weight, Drill	60 lbs.
Air Hose	3/4"
Water Hose	1/2"
Feed Travel	36" — 48" — 60"
Closed Length	56 3/4" — 69" — 81 1/4"
Extended Length	92 3/4" — 117" — 141 1/4"
Air Leg Weight	30 lbs. — 34 lbs. — 37 lbs.

CLEVELAND AL-91 Single-Extension Air Leg for use with any 35-lb., 45-lb., or 55-lb. class rock drill. Feed control built into air leg.

SPECIFICATIONS

Standard wet, or automatic controlled, wet-type backhead available.

Air Hose	3/4"
Water Hose	1/2"
Feed Travel	36" — 48" — 60"
Closed Length	58" — 71" — 83"
Extended Length	94" — 119" — 143"
Air Leg Weight	35 lbs. — 38 lbs. — 41 lbs.

per man-shift!

to drill rock

Choose the drilling combination that's best for you from the industry's only complete line of telescopic or single-extension air legs.

MINERS like to use a CLEVELAND Air Leg and H10AL Drill combination. It gives them real flexibility — they can use it as a drifter . . . as a stoper . . . or as a hand-held drill . . . set-ups are quick and easy.

It's an easy-handling combination, also. The air leg supports the drill and absorbs fatiguing recoil. You get flexible feeding pressure, too — from zero to full line. That's why miners drill more footage with CLEVELAND, yet are less tired at the end of their shift.

Exclusive CLEVELAND built-in feed control in the H10AL Drill eliminates a third hose and cumbersome "Y" connections. There's no feed-control bleed valve — the operator doesn't have to bleed off air continuously, to maintain suitable feeding pressure. He can change or advance the position of the leg easily and quickly.

The air leg holds the drill in line with the hole — thus reducing front-end drill wear and practically eliminating rotation strains.

These are ways a CLEVELAND Air Leg and H10AL Drill combination helps you get more drilling for less cost. Take advantage of them.

Write today for Bulletin RD-30 for complete information.

CLEVELAND AL-93 Telescopic Air Leg for use with any 35-lb., 45-lb., or 55-lb. class rock drill. Feed control built into air leg.

SPECIFICATIONS

Full Feed Travel	4'	6'
Collapsed Feed	2' ea. piston	3' ea. piston
Closed Length	50"	62"
Extended Length	98"	134"
Air Leg Weight	42 lbs.	47 lbs.

LE ROI

CLEVELAND ROCK DRILL DIVISION
Westinghouse Air Brake Co.
12500 BEREA ROAD • CLEVELAND 11, OHIO RD-30

Plants: Milwaukee, Wisconsin • Cleveland — Greenwich — Dunkirk, Ohio • Coldwater, Michigan

11-RU Universal Cutter, courtesy Joy Manufacturing Co.

MORE BITS in the LINE...

A BETTER FIT in the MINE!

★ 20 Different Styles of Cutter Bits

★ 2 Styles of Finger Bits

★ 2 Styles of Roof Bolting Bits

★ 3 Styles of Coal Drill Bits

Write for your copy of the CARMET MINING TOOL CATALOG

This informative 16-page booklet gives complete data, sizes, etc. on all styles of Carmet carbide-tipped cutter and drill bits. Also included is a valuable methods manual on reconditioning methods and equipment. Your copy gladly sent free on request.

ADDRESS DEPT. CA-59

The unequalled range of selection that is available to you in Carmet carbide-tipped coal cutter and drill bits simply means this: that you can match up your bits just that much more closely with the actual conditions you have!

And *that* means you can profit by the greatest increase in cutting speed and tons cut per bit setting—the greatest reduction in down time and in overall bit cost per ton—that is possible for you to secure *anywhere* with carbide bits. What's more, you have added assurance of top efficiency in the overlaying cap of steel that *double-bonds* the carbide tip of each Carmet cutter bit firmly in its seat. That's a feature which Carmet *originated*. It operates to protect you against tip loss, and to permit cutting on both sides as well as in front—eliminating side drag, reducing power consumption, etc.

Even the shank steel in Carmet carbide bits is a product of quality control: tough enough to insure against bending or breakage, yet of a hardness to permit set screw locking. ● Just *try* Carmet bits—see for yourself what they'll do! We'll be glad to cooperate with you in proving their advantages on *your* job. ***Allegheny Ludlum Steel Corporation, Carmet Division, Wanda and Jarvis Avenues, Detroit 20, Michigan.***

The Original DOUBLE-BONDED Carbide Bit

CARMET® AL

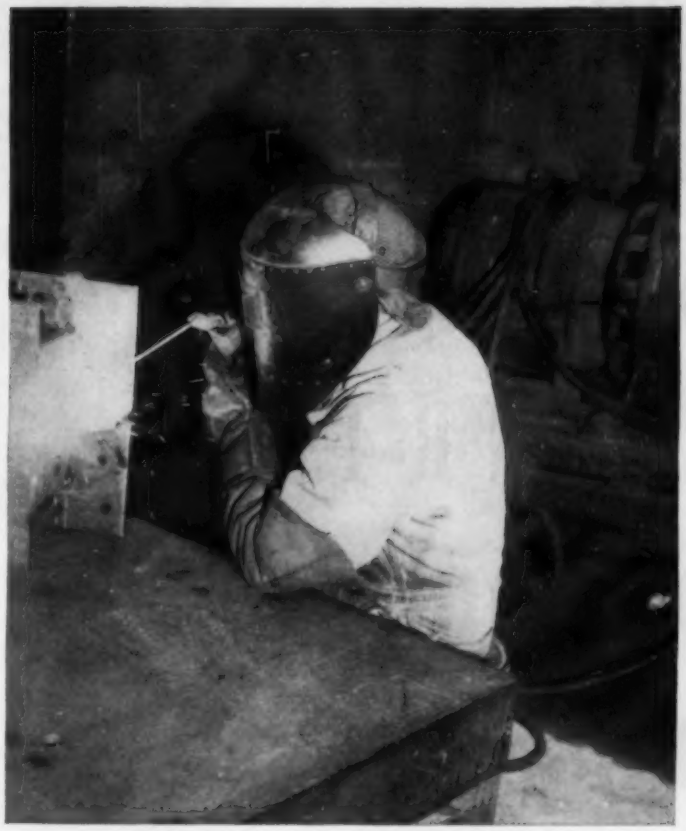
WAD 5412

TIREX... Friend of Welders and Replacement Costs

Whether welding is easy and economical depends, to a large degree, upon the cable. If the cable is very flexible, it won't tire the operator by dragging on his wrist. If it can stand hard usage without failing, replacement costs are reduced.

The nearer welding cable is like limp rope in pliability, the easier it is to work with. Simplex-TIREX Welding Cable pliability depends upon making the conductors of many hairfine copper wires closely stranded together. A paper tape between conductors and jacket for easy stripping does not hamper flexibility.

The most wear-resistant welding cable jackets are made with properly-compounded neoprene and cured in lead. Neoprene resists acids, alkalies, abrasion, flame, oil, sunlight, and water. Curing in lead produces a dense, tough jacket. Simplex-TIREX Welding Cables are made with Selenium Neoprene Armor and cured in lead.



Simplex

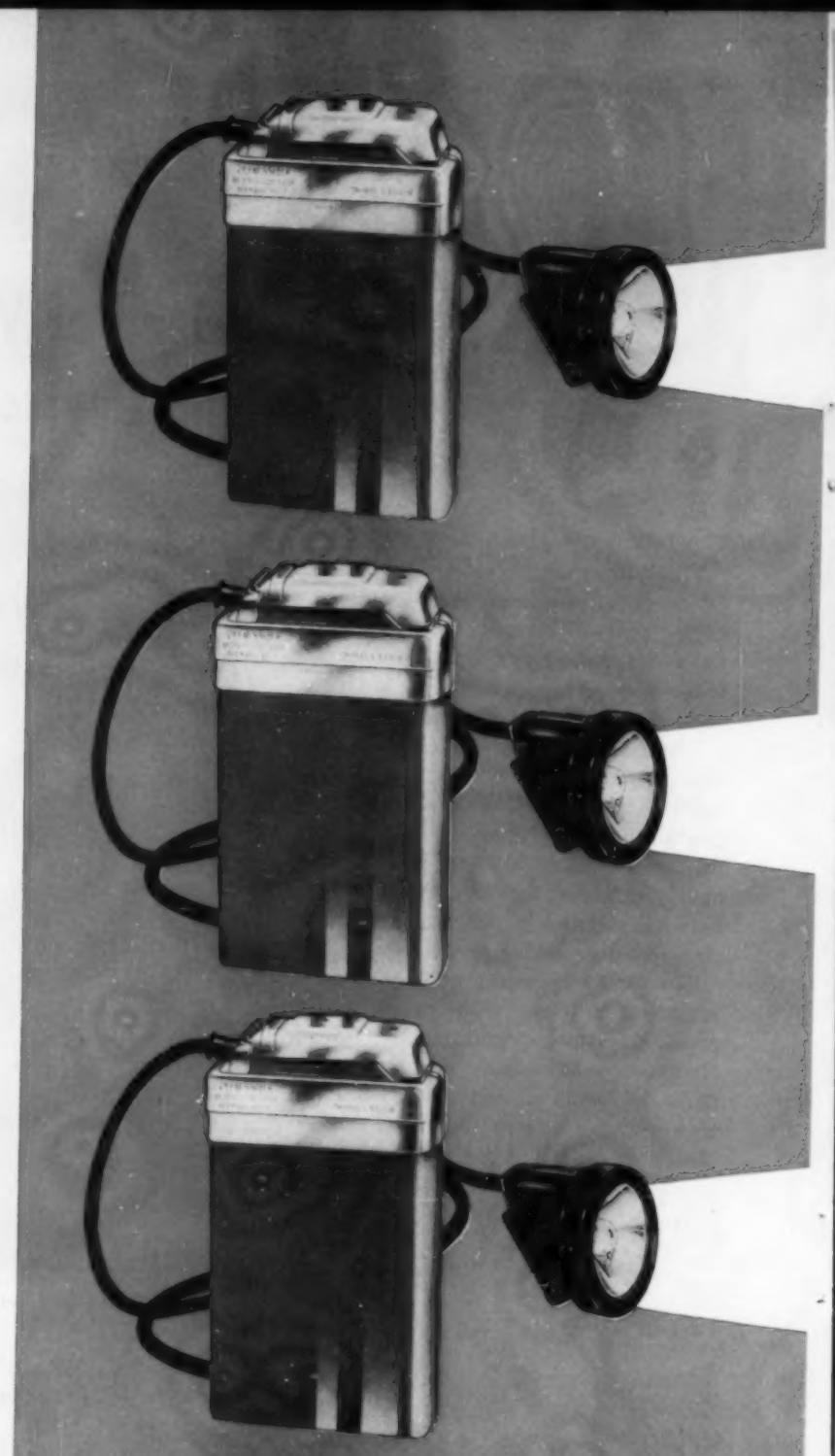
TIREX CORDS AND CABLES *are made only by the*

SIMPLEX WIRE & CABLE CO., 79 Sidney St., Cambridge 39, Mass.

Although welding cable sizes generally used range from No. 2 A.W.G. to No. 3/0 A.W.G., Simplex-TIREX Welding Cables are made in sizes No. 8 A.W.G. to 1,000,000 Circular Mils. Catalog No. 1011 has complete details. Write for it.

You can depend on the EDISON R-4's brilliant, unfailing light...

SERVING SAFETY 40 YEARS 1914 • 1954



MSA

SAFETY EQUIPMENT HEADQUARTERS

When you have a safety problem, M.S.A. is at your service . . . our job is to help you

The Bulb's reserve filament means continued, full light

See the double filament in the bulb? It's your proved protection against lost time for the miner, and a short crew for the foreman. If one filament burns out, a turn of the switch restores continued, brilliant, full illumination—*working light*, not just emergency light!

The Battery that doesn't fail on the job

Because light is only as dependable as the battery that provides the power, battery service life is the only answer to performance. The Edison R-4 Battery does not destroy itself to function, does not deteriorate when not in use . . . gives you the most dependable light, shift-after-shift, for years.

The M.S.A. Service Engineer makes your lighting his business

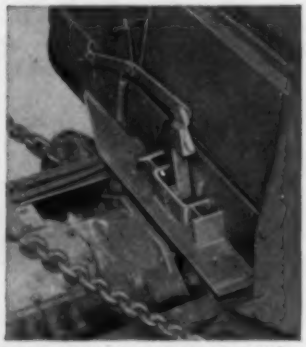
Your Edison lamp installation—Self-Service, Standard or Modified—is the responsibility of a trained M.S.A. Service Engineer. His planned system of return calls insures your receipt of the maximum service from your lamps. You benefit from this responsible know-how in peak lamp performance, more efficient and economical lamphouse procedure.

MINE SAFETY APPLIANCES COMPANY
201 North Braddock Avenue, Pittsburgh 8, Pa.
At Your Service: 77 Branch Offices in the United States and Mexico

MINE SAFETY APPLIANCES CO. OF CANADA, LTD.
Toronto, Montreal, Calgary, Edmonton, Winnipeg, Vancouver, Sydney, N.S.

These Edison R-4 QUALITY features, and service, give you that *extra* illumination that lets you realize every production advantage from today's mechanized equipment. Let us show you how this vital mining tool can help fill the gap between average and peak production with greater safety. Write for details.

GRAVITY DUMP



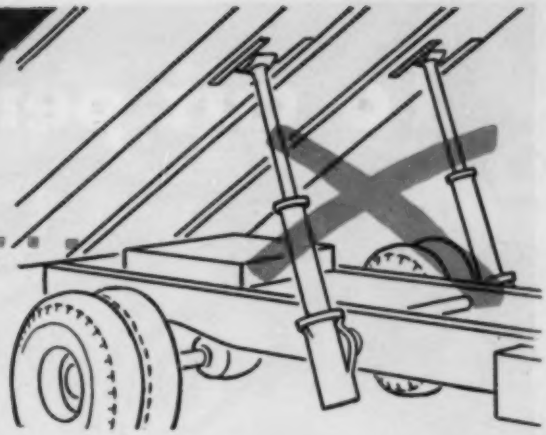
SIMPLE BODY RELEASE LEVER WORKS *INSTANTLY*

1 Body release lever is located in cab to left of steering wheel. Lever engages toggle linkage to latch hook on chassis . . .

2 Trip rod instantly releases latch hook from body latch seat on the tilting Dumptor body. Gravity dumps load instantly as . . .

3 Body rolls on heavy-duty rockers. Snub chains attached to big coil spring shock absorbers check body at 70-degree tilt.

eliminates body hoists.....



Koehring Dumptors®

have no slow-working body hoists. Operator trips the body-release lever . . . and gravity dumps the 6-yard load in just one second. It's as simple as that!

Saves 20 seconds every time you dump Because there is no waiting for slow-raising body hoists, one-second dumping saves 15 to 25 seconds dump-time on every cycle. This gives you more productive haul-time . . . earns an important increase in extra yards per hour.

Never balks . . . never wears out . . . There are no expensive hoist replacement parts, hoist maintenance or down time to eat into your profits. Koehring gravity dump is always instantaneous, trouble-free in all temperature extremes . . . never balks . . . never wears out.

No spring maintenance is another money-saving Dumptor advantage. There's just one big, double-coil chassis spring on steering axle, none on driving axle. Big shock-absorbing drive tires eliminate need for more springs . . . save spring maintenance time and replacement costs.

Check your body hoist and spring maintenance costs for a year. See how much you'll save when you haul with Koehring heavy-duty Dumptors. Get all the facts from your Koehring distributor soon . . . or write us for 28-page Dumptor catalog.

KOEHRING COMPANY

MILWAUKEE 16, WISCONSIN

KOEHRING HEAVY DUTY

Subsidiaries: PARSONS KWIK-MIX • JOHNSON

To cut perfect threads

7 Points of uniform goodness in YOUNGSTOWN PIPE

- uniform ductility
- uniform lengths
- uniform threading
- uniform weldability
- uniform wall thickness and size
- uniform strength and toughness
- uniform roundness and straightness

Youngstown

QUALITY · YOUNGSTOWN · SERVICE

●When the mechanical threader goes to work on Youngstown pipe, you can depend on it that the threads cut will be perfect and leak-proof. That's because the steel is of highest quality, controlled by a single manufacturer from ore mine to final inspection of the pipe.

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

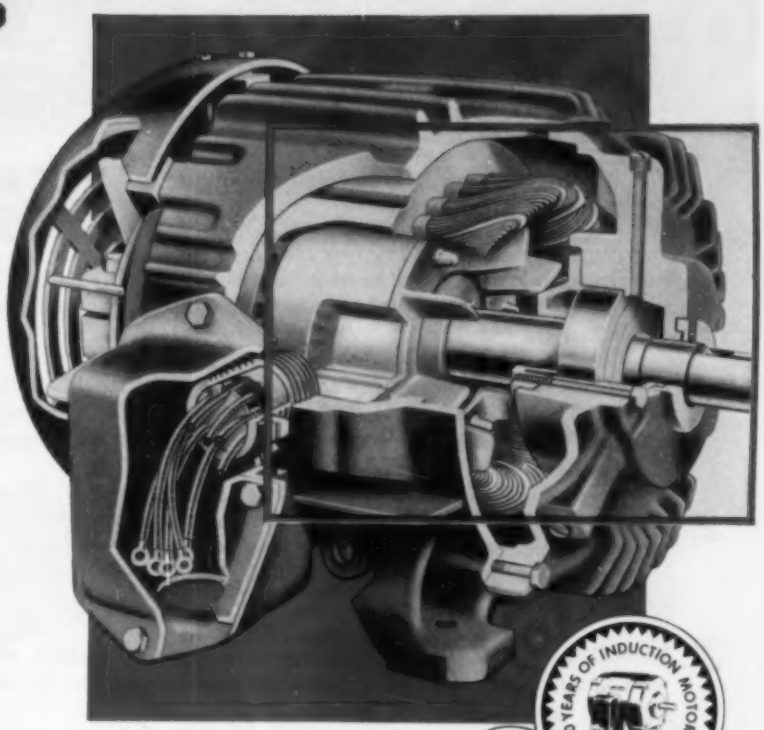
General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

It takes Six Bolts –

not just four

to give full bearing protection for greater motor performance



THE TWO EXTRA BOLTS in the end housing of every Allis-Chalmers ball bearing motor are the proof of *extra* protection against bearing failure. These are the bolts that hold the bearing cap tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure . . . protects the grease and the bearing against contamination from dirt and moisture.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

Result? Allis-Chalmers motors pay off in longer, trouble-free bearing life, lower motor maintenance.

50 YEARS OF INDUCTION MOTORS
ALLIS-CHALMERS-NORWOOD WKS.

Get all the facts . . . judge for yourself — Compare Allis-Chalmers motors with other motors. Get the six-bolt construction that gives you complete bearing protection. For proof, see your Allis-Chalmers Office or Authorized Distributor, or write — Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-C ALLIS CHALMERS

A-4444

FOR THAT EXTRA MARGIN IN SHOVEL PERFORMANCE...

BUCYRUS ERIE

WARD LEONARD ELECTRIC EXCAVATORS

MORE OUTPUT even under the toughest conditions . . . more loads per shift in any quarry or mine . . . extra loads for that EXTRA MARGIN in performance . . . that's what you get from this exclusive combination of shovel front-end features:

1. **TWO-SECTION BOOM** provides maximum strength with minimum weight. The lower section is rigidly connected to the A-frame . . . takes the heavy stresses of the digging cycle in stride because it is part of the main machine.

2. **TUBULAR DIPPER HANDLE** is much lighter than equivalent two-member handle, yet equally strong. Its ability to rotate in the rubber-cushioned saddle block eliminates torsion during the digging stroke, minimizes shock loads.

3. **TWIN DUAL HOIST ROPES** assure a steady, positive digging action with automatic shift of hoist power to that part of the dipper lip where it is needed.

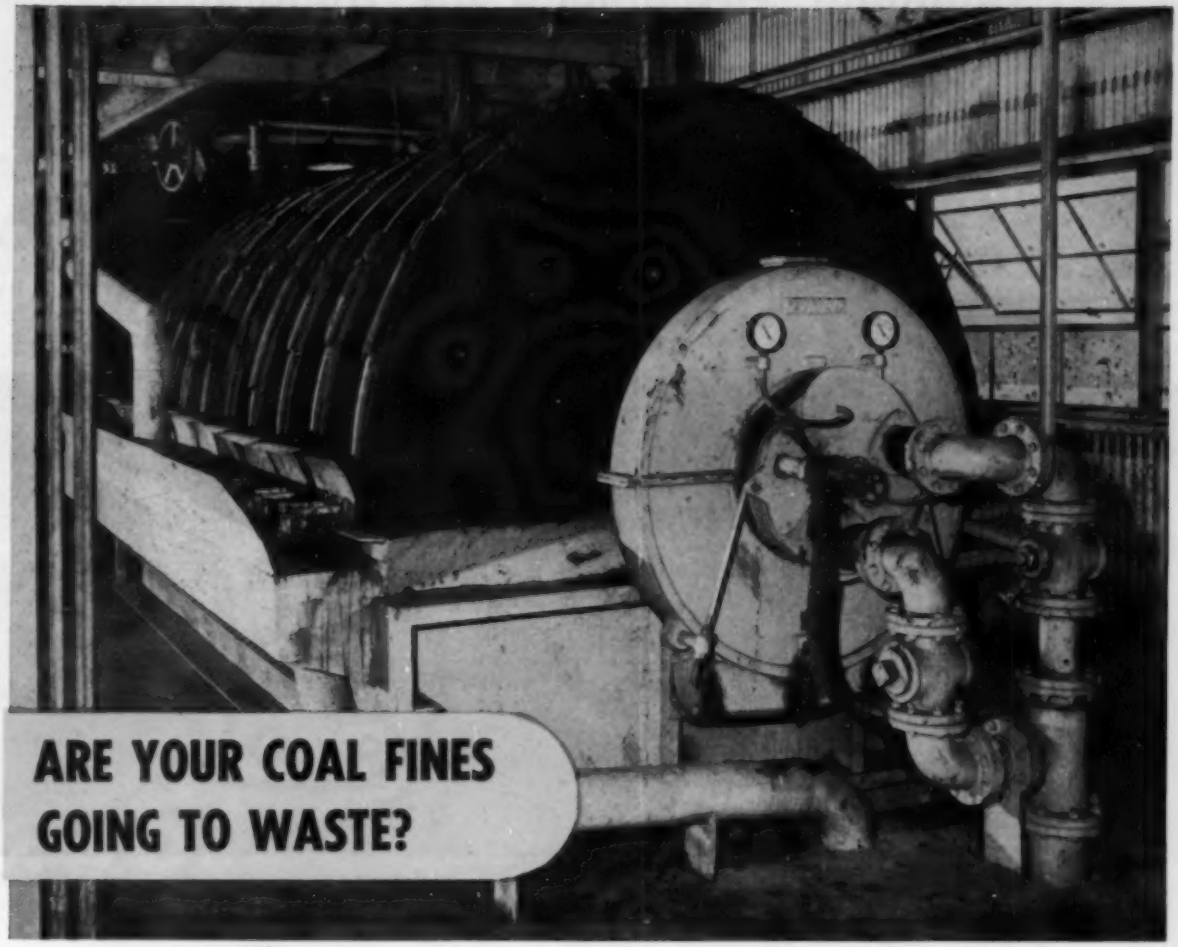
4. **INDEPENDENT ROPE CROWD** is simple, positive and quiet. Shipper shaft pinions and handle racking are eliminated. Crowd machinery is located on main deck rather than on boom — swing inertia is reduced, the operating cycle speeded up.

5. **QUICK CONVERTIBILITY** to dragline of the independent motor type. Hoist and drag functions are powered by separate motors, eliminating operating clutches and brakes. 5154

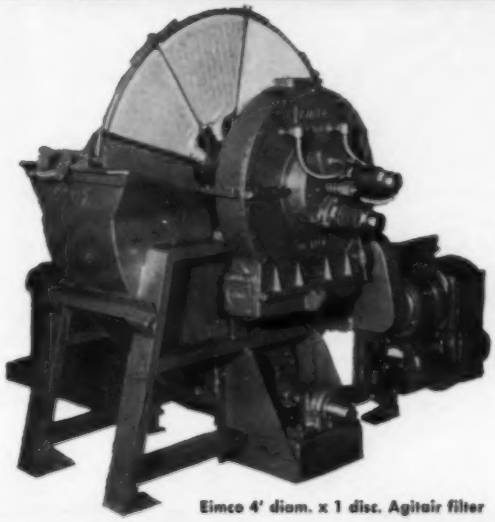
These features — plus many more — make Bucyrus-Eries the finest heavy-duty excavators ever built: yard for yard, dollar for dollar, pound for pound. Write today for complete information on the 4½-yd. 110-B, the 6-yd. 150-B, or the 8-yd. 190-B.

Bucyrus-Erie Company

SOUTH MILWAUKEE
WISCONSIN



ARE YOUR COAL FINES GOING TO WASTE?



Eimco 4' diam. x 1 disc. Agitair filter

Coal fines are an economical source of revenue, they can be reclaimed and will pay in a short time, for all equipment necessary to make the installation.

Several flow sheets employ Eimco filters as the dewatering equipment in plants set up to reclaim the fine coals. Eimco filters are best because they do the job for less money.

Eimco filters will dewater greater tonnages per square foot of filter area per hour. They are simple in design and built for long periods of continuous operation with a minimum of attention. They produce a thick, evenly distributed cake formation, uniformly dried to low moisture content. Eimco filters have a clean discharge of the cake which provides much greater bag life and many other advantages.

Write for complete information on fine coal dewatering with Eimco Agidisc filters.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Texas Birmingham, Ala. Duluth, Minn. Kellogg, Ida. London, Eng. Paris, France Milan, Italy

EIMCO

B-81

You Can't Beat An Eimco!

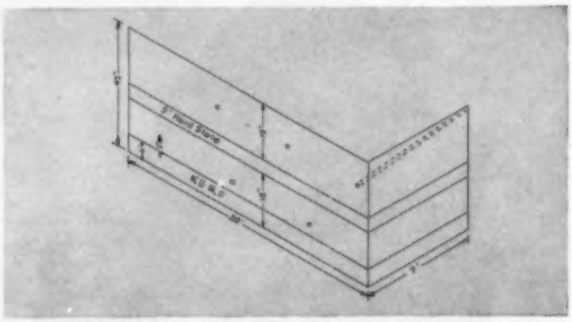
"'Monobel' AA breaks up 'middleman' ... gives us good loadability, low ash"

States Major W. P. Tams, Jr., President and Genl. Mgr., Gulf Smokeless Coal Co. of Tams, W. Va.

"Naturally, we need coarse coal and low ash," Major Tams asserted, "but it's not always easy to come by. Take our No. 2 Mine, with occasional 'middleman' 2"—8" thick. Some permissibles we tried could lay the slate down, but only in large chunks that required hand breaking; others powdered it, raising the ash content. Monobel® AA was the only one that did a good job on both coal and 'middleman,' and with a minimum of 'fines.' For years, it's given us firm lump and low ash, which makes for good loadability . . . high production in the cleaning plant."

TESTING for gas on the #4 Pocohantas Seam. Here's a typical fall: good-sized coarse coal that spells efficient loading, high tonnage per man. Major Tams phrased it this way: "We like 'Monobel' AA because it loads to back of holes and throws the coal out, with good, clean breaks at the ribs and back. Our loaders can get right to work on it."

FACE ready for undercutting. Note how "Monobel" AA has squared up the face right through the "middleman," cleaning the ribs. "This shearing action helps us get the most out of each shot, and 'Monobel' AA is easy on our roof."



ALL ROOMS are undercut in the shooting pattern worked out with the assistance of Du Pont technical-service men. This is the type of job that takes all a permissible can give—and "Monobel" AA has what it takes.

Whether your mine contains a "middleman" or not—you can get the good breakage you need with Du Pont "Monobel" AA. Its slow, spreading action gives a high percentage of coarse coal, with a minimum of "fines"... cracks rock into loadable sizes, too. The many mines using it must be satisfied, for today it's the world's largest-selling permissible. If you haven't tried "Monobel" AA, test it soon. For complete information, contact the Du Pont Explosives man in your district, E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Del.

DU PONT
PERMISSIBLES
Blasting Supplies and Accessories

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

NEW IDEAS (for improved bearing performance)

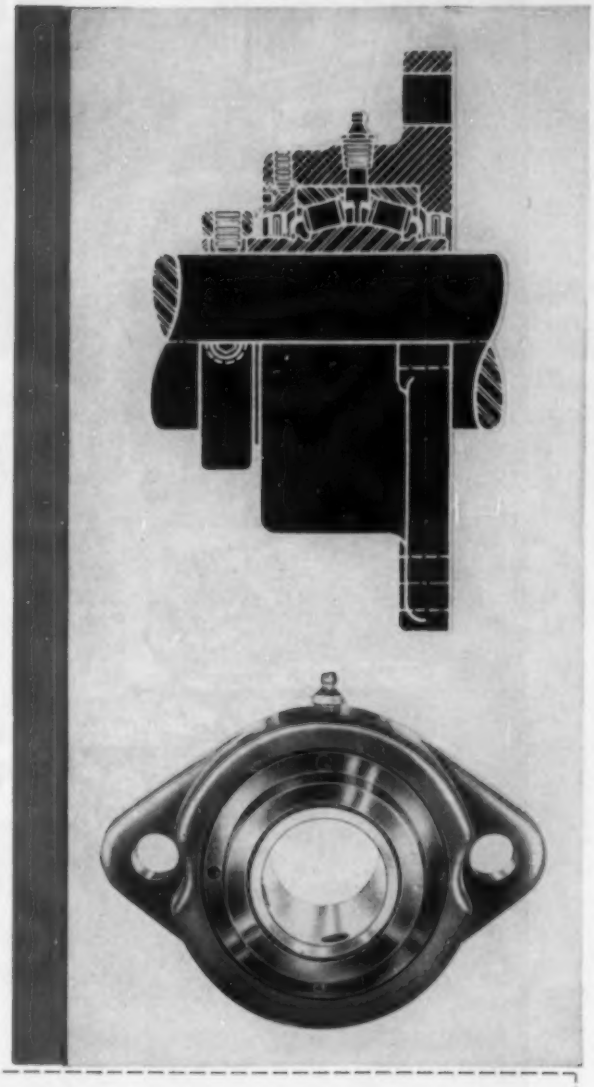
ARE AN OLD STORY AT BEARINGS, INC.

EXAMPLE... Sleeve bearings in chain conveyor head units are constantly breaking down —dirt, corrosion and vibration were too much for this type of installation. Maintenance costs were far beyond normal.

SOLUTION... Bearings, Inc. engineers designed a malleable iron housing to take the pounding of the conveyor. A Link Belt double row, self-aligning roller bearing was installed with pressure relief lubrication fittings which solved the dirt and corrosion problem.

THE RESULT... Much less maintenance, far longer bearing life and increased capacity. The installation was simple for the new housing exactly fit the old bolt holes. This unit is now produced in two shaft sizes—S-207978—1 15/16 and S-207989—1 11/16.

This has just been one of many successful engineering projects developed by Bearings, Inc. If you have a bearing problem, large or small, call or write. We are ready to help you.



WEST VIRGINIA: Charleston • Huntington • Wheeling
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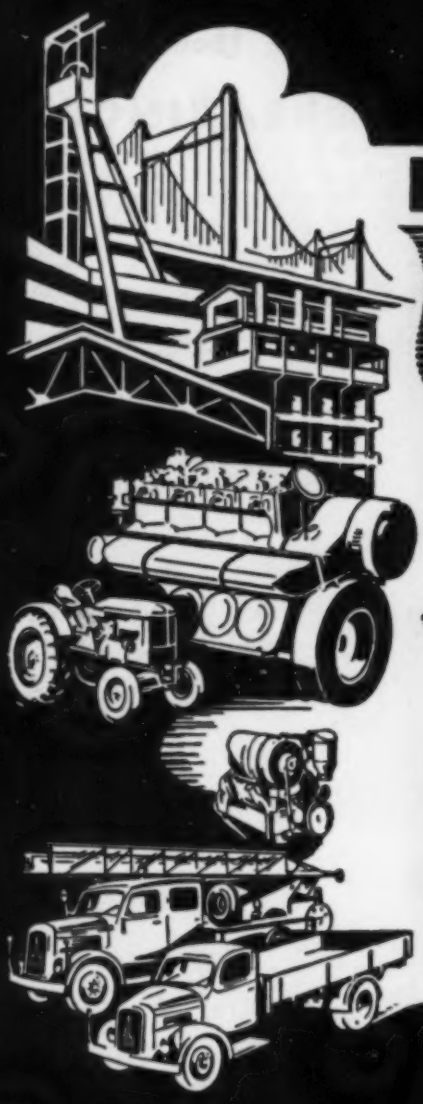
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute
NEW JERSEY: Camden

BEARINGS, INC., 1516 Kanawha Blvd., West Charleston 2, West Virginia

Gentlemen:
We have a bearing problem we would like to discuss with you.

Name_____
Firm_____
Address_____
City_____ Zone____ State_____



HUMBOLDT

Since 1856

Mines Equipment, Mineral Dressing Plants, Crushing and Grinding Machinery, Cement Mill Outfit, Metallurgical Works, Coal Preparation Plants, Steel Constructions for Buildings and Bridges.

DEUTZ

Since 1864

Otto-, Gas-, Diesel-Engines for Every Purpose of Two- and Four-Stroke design. Output range 3 - 1500 H.P. Cooled by water or air. Diesel-powered tractors, Diesel locomotives, Gas producer plants.

MAGIRUS

Since 1864

Trucks and busses driven by air-cooled DEUTZ Diesel engines, Vehicles for municipal services, Fire ladders, fire engines, Fire fighting water trucks, Two-wheeled ladders, Fire fighting equipment.

KLÖCKNER-HUMBOLDT-DEUTZ AG · KÖLN U. ULM

Send inquiries to either Köln, Germany or Ulm, Germany

Address inquiries from U.S.A., Alaska, Hawaii and Puerto Rico to: DIESEL ENERGY CORPORATION, 143 Liberty Street, New York 6, N.Y. Certain territories open for distributors.

the dirt flies faster—now with **MUSCLES OF STEEL**

Straining laborers plying pick and shovel are a bygone memory because of today's excavating and road-building equipment. Modern power shovels and draglines use *muscles of steel*—rugged wire rope—to keep the dirt flying fast.

Helping to clear the way for needed highways is another of the important ways in which Wickwire Rope contributes *muscle* to America's might.

You'll find Wickwire Rope, too, in the mines and the quarries . . . in the oil fields and logging camps . . . with the fishing fleets . . . and in numerous materials handling operations. Whatever the job may be, the extra care and quality fabrication that goes into Wickwire Rope proves itself in longer life, more economical service and utmost reliability.

every industry benefits from wire rope

WICKWIRE ROPE

CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

2533

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New Orleans • New York • Philadelphia

WESTMORELAND COAL HAS FOUR G-E 25-TON DIESEL-ELECTRICS AT ITS HAMPTON MINES. ONE LOCOMOTIVE HAULS AS MANY AS SIX LOADED CARS PER TRIP.

6 reasons why . . .

You can get more productive surface haulage with a G-E diesel-electric locomotive

1. **FULL UTILIZATION OF POWER**—electric transmission delivers full power for all normal speed and tractive effort requirements.

2. **HIGH AVAILABILITY**—in normal service, you can expect a G-E diesel-electric to be on the job 24 hours a day, seven days a week, with only about eight hours out for maintenance. It carries sufficient fuel for several days. Refueling and oiling can be carried out during shift changes.

3. **FAST, FLEXIBLE POWER**—helps speed up your haulage. Response to the throttle is instantaneous. Acceleration is quick and smooth. Reversing is a simple operation.

4. **SIMPLIFIED MAINTENANCE**—there's no fire-cleaning, ash-handling, watering, or watching, because a G-E diesel-electric does not have boiler or fire-box. Neither does it have mechanical transmission with its inherently high maintenance.

5. **EASIER ON THE TRACKS**—smooth traction, short wheelbase, low weight per axle, add up to less wear on your tracks. A G-E diesel-electric has no dynamic augment or heavy reciprocating parts to place undue strain on the tracks.

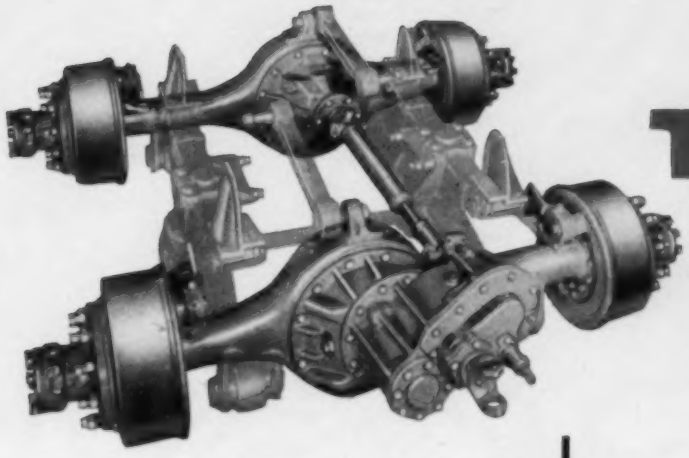
6. **HAZARDS REDUCED**—the G-E diesel-electric does not emit smoke or harmful gases. It is ideal for use in mining operations.

G.E. makes diesel-electric locomotives in seven standard sizes: 25, 35, 45, 50, 65, 80, and 95 tons. Ask your G-E Apparatus Sales representative for more details about them. Or, write to: General Electric Co., Section 120-70, Schenectady 5, N. Y.

Progress Is Our Most Important Product

GENERAL ELECTRIC

SIX reasons for the superior performance of



EATON TANDEM DRIVE AXLES

1 Designed Specifically for Tandem Operation,
Eaton Tandem Axles are not subject to abnormal stresses or complicated lubrication problems.

2 Single Drive Line
on a normal angle gives a direct lead from power divider to rear axle; simplifies design, eliminates excess parts, minimizes maintenance.

3 Rugged Power Divider
mounted on forward axle, is of simple design; provides for transmission of power equally to both axles.

4 Inter-Axle Differential
in power divider assures equalized power transmission even though wheel speed may vary due to road irregularities or tire diameter variations.

5 Differential Lock-out
between forward and rear axles (optional on some models) provides positive drive to each of the axles, when required because of soft or slippery road conditions.

6 Maximum Strength with Minimum Weight
is achieved through simplified design, experienced engineering, and accurate fabrication.

Ask your truck dealer to explain how Eaton Tandem Drive Axles provide trucks with greater load capacity—reduce tire and operating costs.

EATON AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

Wire Rope at Work—This is the double-track or twin-slope haulage system used at a large Alabama mine. Up the slopes to the surface come heavily-loaded strings of cars, the trains being hauled by staunch wire rope.

The Bethlehem rope in the picture has an interesting history. This 1-in. Purple Strand line had been working for more than three years when the photograph was taken; had hauled approximately 1,000,000 tons of coal, rock, and other heavy materials. It had equalled the all-time record for the operation at this particular mine, and was still going strong, with new records in prospect.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:
MINING • CONSTRUCTION • PETROLEUM • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING

They are still burning coal over 400,000,000 tons of it, and that is a lot of coal.

Are you getting your share?

This is no time for static thinking. Your participation in the coal market is just what you make it—measured only by what you can give the buyer.

Look about you. Examine the sales record.

Whose coal is being sold?

Who designed, manufactured, and erected their preparation plants?

Why is their coal being preferred *over yours*?

Because they are delivering a better fuel—better washed, better screened, better dried, and are doing all this at a *lower cost per ton*. They are doing it for all of the country's great coal-consuming markets, and they are doing it with McNally Pittsburg-built plants.

Ask
the men who know coal from the ground up

McNALLY PITTSBURG
MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation—Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
Engineering and Sales Offices: Pittsburgh • Chicago • Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio

FIRST CLASS
PERMIT No. 93
(Sec. 34.9, P. L. & R.)
PITTSBURG, KANSAS

BUSINESS REPLY CARD
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

4c-POSTAGE WILL BE PAID BY—
McNally Pittsburg Mfg. Corp.
PITTSBURG, KANSAS

A Few of America's Leading Coal Producers

who are getting their share

OF THE 400,000,000 TON MARKET

Alabama By-Products Corporation
Alabama Power Company
Alaska Railroad Company
Alston Coal Company
Amherst Coal Company
Ayrshire Collieries Corporation

•

Beaver Coal and Mining Company
Bell & Zoller Coal & Mining Company
Bevier Coal Company
Blackfoot Coal & Land Corporation
Black Star Coal Corporation
Blue Diamond Coal Company
Boone County Coal Corporation
Broken Arc Coal Company
Brophy Coal Company
Butler Consolidated Coal Company

•

Carmac Coal Company
Central Coal Company
Coal Processing Corporation
Coiltown Mining Company
Colonial Coal Mining Company
Columbian Southern Chemical Company
Crowe Coal Company

•

Dawson Collieries
Dawson Daylight Coal Company
Delta Coal Mining Company
Dering Coal Company
Diamond Smokeless Coal Company
W. G. Duncan Coal Company

•

Eastern Coal Corporation
Eastern Gas & Fuel Associates
Emerald Coal & Coke Company
Ethel-Chilton Mines, Inc.

•

Fairview Collieries Corporation
Forsyth-Williamson Coal Company

•

Gaston Coal Company
The Dorothy Gordon Mining Company
Gulf Smokeless Coal Company
Guyan Eagle Coal Company

•

Hanna Coal Company
Homestead Coal Company
Hopkins County Coal Company
Hume-Sinclair Coal Mining Company

•

Jewell Ridge Coal Corporation
Jones & Laughlin Steel Company
Julia-Ree Coal Company

•

Kaiser Steel Corporation
Ken Coal Company
Kentucky Sun Coal Company
Key Coal Company
Kirkpatrick Coal Company

•

Linton Summit Coal Company
Lone Star Coal Co., Inc.
Lone Star Steel Company
Lynnville Coal Company

•

Mahan-Ellison Coal Corporation
Marriott Reed Coal Company
Mather Collieries
The Maumee Collieries Company
Mid-Continent Coal Corporation
Middle Fork Coal Co., Inc.
Midland Electric Coal Company
Midwest Utilities Coal Corporation
Milburn By-Products Company
Montana Coal & Iron Company
Morgan Coal Company
Morgan Mines, Inc.

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New River & Pocahontas Consolidated Coal Company
Northeast Kentucky Coal Company
Northern Illinois Coal Company

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OK Coal Company
Old Ben Coal Corporation

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Palmer Coking Coal Company, Inc.
Paradise Collieries, Inc.
Peabody Coal Company
Pioneer Coal Company
Pittsburg & Midway Coal Mining Company
Pond River Collieries
Power Coal Company
Pyramid Coal Company

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Raleigh Wyoming Mining Company
Red Cedar Coal Company
Red Jacket Coal Corporation
Renton Coal Company
Republic Steel Corporation
Ridgeview Coal Company
Roslyn-Cascade Coal Company

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St. Louis & O'Fallon Coal Company
Sahara Coal Company
Scotia Coal & Coke Company
Seminole Coal Company
Shasta Coal Corporation
Slab Fork Coal Company
Sloss Sheffield Steel & Iron
Snow Hill Coal Corporation
Southwestern Illinois Coal Corp.
Sunlight Coal Company
Sunnyhill Coal Company

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Tasa Coal Company
Tecumseh Coal Company
Ten X Coal Company, Inc.
Triple "S" Coal Company
Truax Traer Coal Company
Turkey Gap Coal & Coke Company

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Union Collieries
United Electric Coal Company
United States Coal & Coke Company
United States Fuel Company
Usibelli Coal, Inc.

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Valley Camp Coal Company
Viking Coal Company
Virginia Polytechnic Institute
Vogue Coal Company

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Winco Block Coal Company
Windsor Coal Company
Windsor Coal & Mining Company

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Yates Coal Company
Youghiogheny & Ohio Coal Company

STATE YOUR PROBLEM HERE OR ON YOUR LETTERHEAD

I am interested in

☐ Washing_____" x 0 at_____tons per hour.

☐ Drying _____" x 0 at_____tons per hour.

Name_____ Title_____

Company_____

City and State_____

( ) Have Sales Engineer call for further consultation.

( ) Send additional information.

You, too, can compete—with better prepared coals—at lower cost per ton

Ask

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

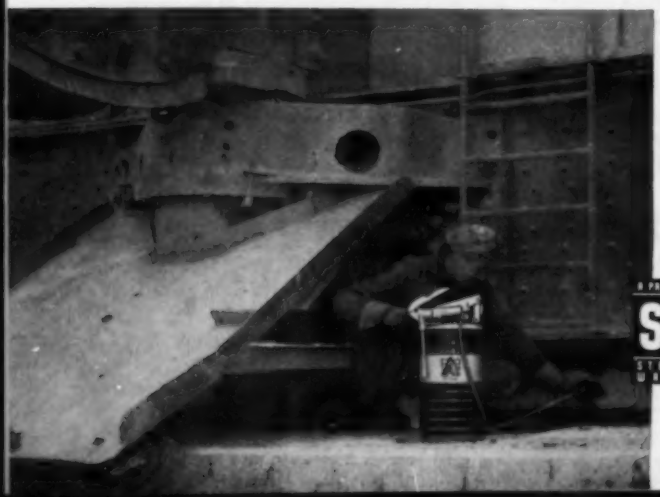
The Men Who Know Coal from the Ground Up

McNally Pittsburg Manufacturing Corporation—Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
Engineering and Sales Offices: Pittsburgh • Chicago • Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio

• Here the sheaves of a shovel get a shot of clean, new lubricant. Operator is using Alemite Hand Gun 1056-SE. This lever-type gun has plenty of power to push out old grease and dirt—has large capacity to serve many bearings without refilling!

• Alemite Loader Pump 7181-L fills a hand gun quickly—easily. Just eight strokes of the pump fills the gun completely, no mess, no waste, no troublesome air pockets. Lubricant is protected at all times from dirt, dust and grit that can ruin bearings.

• Here the roller track that carries the massive weight of a dragline and takes the tremendous pull from the boom is being lubricated with an Alemite 7137-A "Red-A" Bucket Pump. Pump provides 5,000 pounds pressure for positive lubrication, large capacity.



IN STRIP MINING...
"tons-per-hour" figures are the same as cash!

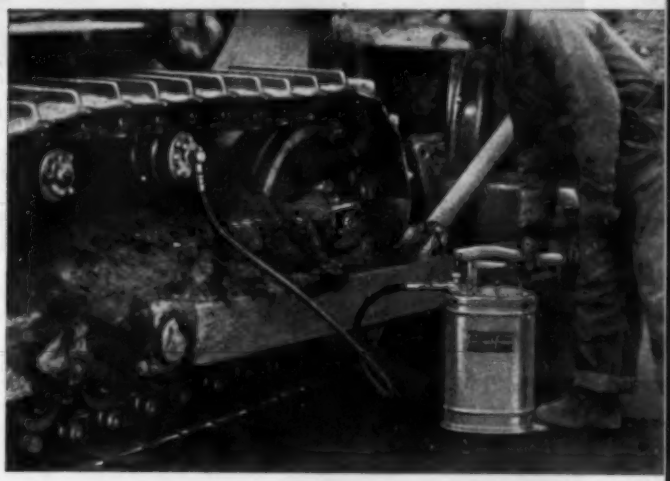
ALEMITE "ON-THE-JOB" LUBRICATION

1. **SAVES TIME!** By bringing clean, fresh lubricant right to the machines—where you need it, when you need it!

2. **BOOSTS TONNAGE!** By cutting expensive downtime for lubrication—increasing output of both men and machines!

3. **SAVES MONEY!** Nowhere are bearings beset by such dangers from grit and abrasion. Here's how to protect them, guard against costly breakdowns!

• The track support rollers of this bulldozer are getting positive lubrication protection from this Alemite 6521-B Tractor Bucket Pump. 35-pound capacity means less time wasted in refilling, and lubricant reaches bearings "refinery clean." Fast—efficient!



ALEMITE

REG. U. S. PAT. OFF.

A PRODUCT OF SW STEWART-WARNER

ALEMITE, Dept. E-114
1850 Diversey Parkway, Chicago 14, Illinois

Gentlemen: Please send me your FREE illustrated booklet showing Alemite "On-the-Job" equipment and containing complete information on Alemite lubrication methods.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

Over-all view of the two belts, reinforced with Du Pont's "Cordura", at the Emerald Mine. Their total length is 4,632 feet, with refuse being carried from coal washer to dumper. Flow makes a 90° turn with a transfer station at the junction of the belts. The belts hug the center idler for better troughing and training throughout their run.

Emerald Coal and Coke Co. reports:

Belts reinforced with Du Pont "Cordura" give topnotch performance under tough conditions

The two conveyor belts in use at the Emerald Mine, Clarksville, Pa., are subject to running conditions that include exposure to all kinds of weather, and the carrying of wet, cold refuse from the coal washer—yet they show no signs of wear after 11 months' trouble-free service.

The belts, reinforced with Du Pont Cordura* High Tenacity Rayon, carry 200 tons of material per hour. Manufactured by The Goodyear Tire & Rubber Co., the belts have caused no delays or shutdowns since their installation. The Emerald Coal and Coke Co., operators of the mine, report excellent all-round belt performance.

The extra strength of Du Pont "Cordura" permits a belt that's thinner, yet stronger. And the low stretch of "Cordura" reduces expensive downtime for take-up and resplicing.

Why not consider "Cordura" before ordering *your* next conveyor belt? Write us for names of suppliers . . . and send for your *free* copy of the new booklet "Mine & Quarry Facts About 'Cordura'". Address: Textile Fibers Department, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

*REG. U.S. PAT. OFF.

Du Pont "Cordura" High Tenacity Rayon

STRENGTH AT LOW COST

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

LOOK what they're saying about

ANACONDA SECURITYFLEX* SHOVEL CABLE

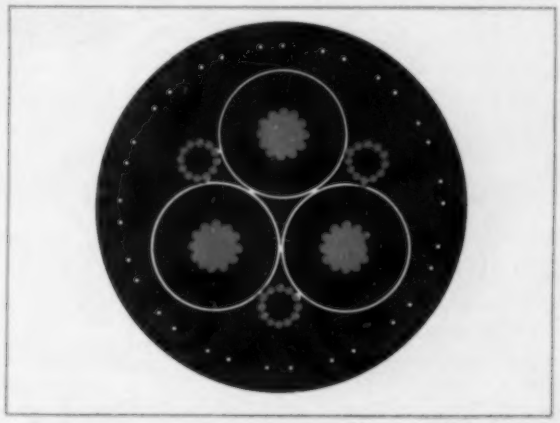
GENERAL MANAGER:
"This cable saves us money . . . there are far fewer breaks . . . and far fewer shorts from ground wires."

MINE ENGINEER:
"No matter how we run it over rocks, it holds up well. It must be the jacket. It wears like iron."

MINE FOREMAN:
"Securityflex sure is flexible . . . mighty easy to handle, too . . . the toughest cable we've ever used."

MINE SUPERINTENDENT:
"Our men can splice Securityflex easily and in less time. That saves us on down-time."

These are the things Anaconda salesmen hear daily about Securityflex Type SH-D Shovel Cable. Why not see *your* Anaconda Sales Office or Distributor for full information about this cable? *Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.* *Trade Mark 54358



AND THE REASON USERS CAN SAY THIS IS BECAUSE:

- **New BUTYL INSULATION provides better resistance to heat, moisture and damage by compression**
- **New NEOPRENE JACKET is tougher and more abrasion resistant**
- **RUBBER CORES cushion the ground wires . . . help prevent broken wires**
- **New COPPER-COTTON SHIELD is easier to splice**

the right cable for the job

ANACONDA®
WIRE AND CABLE

The first condenser discharge type blasting machine utilizing a high voltage DC generator directly connected to charge the condensers.

Dependable blasting starts with a dependable blasting machine. And this new Atlas blasting machine is designed to give you every advantage in dependability and safety.

Hand actuated generator operation does away with battery replacements and gives consistent voltage in both hot and cold weather.

Built-in Volt Meter shows actual voltage while the condensers are being charged.

Adequate voltage assured. The condensers cannot discharge into the firing circuit below a predetermined voltage.

No danger of a residual charge in the condensers. With the condensers connected directly to the generator, any residual charge is dissipated quickly.

Simplified operation. The generator is hand operated. The firing trigger may be closed or open during the voltage build-up. Only when the voltmeter needle indicates optimum power can the firing circuit be activated.

Waterproof. The entire unit is sealed and the switch is waterproof. The new Atlas blasting machine is always ready to go . . . under all conditions.

Sturdy, welded steel case is compact and easy to handle. The whole machine weighs only 30 lbs.

Insulated-type terminals. Binding post screws are made of a non-conducting material. Terminals are well separated for maximum safety.

For complete information on this new blasting machine, get in touch with your Atlas representative. He will be glad to give you full details and arrange a demonstration if you wish.

ATLAS

ATLAS EXPLOSIVES

"Everything for Blasting"

ATLAS POWDER COMPANY,
WILMINGTON 99, DELAWARE

Offices in principal cities

drill
buried
profits from
"stripped-out"
mines
CARDOX
AUGERMINER
salvages high-profit
tonnage "lost" under
excessive overburden
Nets up to 50 tons per man shift.
Drills back 100 feet or more into already exposed seam.
Produces coal ready for mechanical loading, practically free of rock and shale.
Gasoline or diesel engines, 155 H.P., handle augers that drill holes up to 38 inches in diameter.

● GET THE COST AND PROFIT FIGURES FROM YOUR CARDOX REPRESENTATIVE OR WRITE FOR FREE COPY OF CARDOX AUGERMINER BULLETIN

CARDOX CORPORATION ● BELL BUILDING ● CHICAGO 1, ILLINOIS

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Phone: Beckley 4812

Benton, Illinois
Phone: Benton 8-2821

St. Clairsville, Ohio
Phone: St. Clairsville 410

Pikeville, Kentucky
Route 2, Box 99
Phone: Robinson Creek 5

Louisville, Colorado
Phone: Boulder
Milkcrest 2-7298

Library, Pennsylvania
Box 427
Phone: Library Colonial 3-6910

Camden-on-Gauley, W. Va.
Phone:

Evansville, Indiana
307 Northwest Fifth St.
Phone: Evansville 3-8964

Ottumwa, Iowa
Phone: Ottumwa

"Be sure of your wire rope"

"WE'RE GETTING top performance from this type of rope. And it's the same with all the other ropes we use... Roebling makes a construction and size that's absolutely right for our requirements. When we buy Roebling we get exactly what we want, when and where we want it."

* * *

Roebling is one manufacturer who makes a complete line of wire rope for mining. And no matter where you are, there's a convenient Roebling branch or distributor to give good and fast service. Call your nearest Roebling office or distributor for a Field Man. He'll recommend the best rope for your equipment, and you'll get it on time and right.

ROEBLING CF&I

Subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J.

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 19325 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

How to make your own Mine Roof Jacks

- *quickly*
- *economically*

1
Duff-Norton supplies the head and handle
2
You supply the pipe to save freight, time and money
3
Add the Duff-Norton base of your choice and you have the perfect Mine Roof Jack

Here's all you do—(1) cut any 2-inch standard steel pipe into lengths desired and (2) attach safe, strong, dependable Duff-Norton head, handle and base fittings. That's all!

You can choose the type of heads, handles and bases best suited to your particular needs. They are available in a variety of types in both 8 and 16-ton capacities (16 ton requires 2-inch *extra strength* pipe). All fittings are painted light grey for better visability.

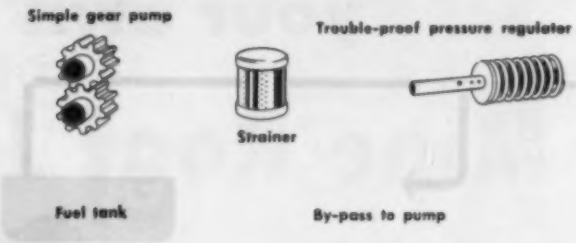
For complete information on Duff-Norton Mine Timbering and Roof Jacks and Fittings see your local distributor or write the world's oldest and largest manufacturer of lifting jacks for your free copy of 8-page catalog, "A Handy Guide for Selecting Duff-Norton Mine Jacks That Meets Every Modern Mining Need." This catalog contains complete information not only on Mine Roof Jacks but other popular Duff-Norton Jacks for useful trouble-free service in and around coal mines. Ask for catalog AD-10J, The Duff-Norton Manufacturing Co., P. O. Box 1889, Pittsburgh 30, Pa. Canadian plant—Toronto 6, Ontario.

DUFF-NORTON *Jacks*

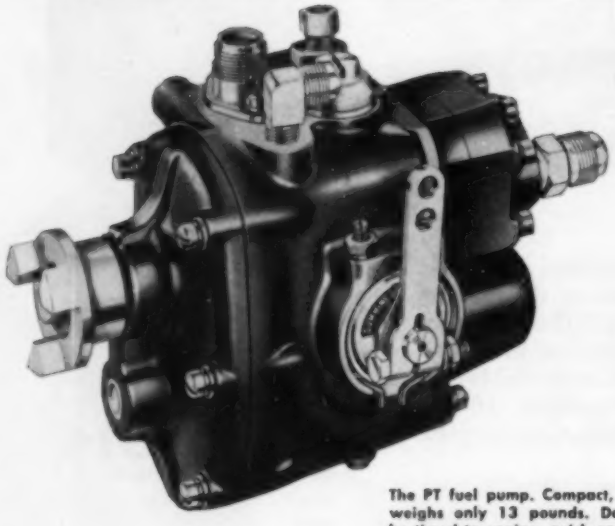
"Giving Industry A Lift Since 1883"

Here's the simplest diesel fuel system ever developed!

Simplest pump and fuel control arrangement



Cummins new PT *fuel system...*

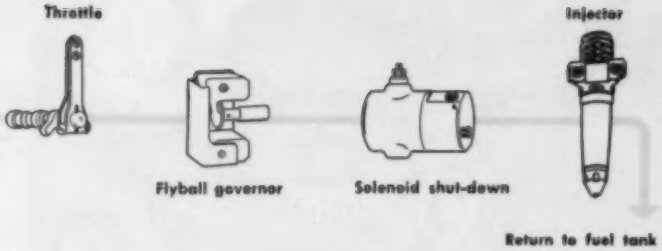


The PT fuel pump. Compact, easy to handle, weighs only 13 pounds. Does not have to be timed to engine, quick and easy to install.

The PT injector utilizes the exclusive Cummins principle of fuel injection which has set the highest standards of performance and economy for more than 20 years.

THE revolutionary new PT fuel system, now standard on all Cummins Diesels, has fewer and far simpler parts than carburetor and ignition systems or ordinary diesel fuel systems. It is easy to understand, simple to work with, can be serviced by any mechanic. No longer any need for fuel system specialists! The PT fuel system has undergone two years of field testing and millions of operating miles under every conceivable condition. Its dependability record is phenomenal. Operators report even less fuel consumption than with earlier Cummins fuel systems and far less cost of maintenance. The PT fuel system can be installed on any Cummins Diesel built since 1932.

Cummins *leader in lightweight high speed diesel power 60-600 h.p.*



PT advantages over gasoline systems:

- No contact points to adjust
- No condenser to replace
- No spark coil to short
- No wiring harness to short
- No spark plugs
- No vapor-lock problems
- No flooding
- No choking or priming
- No needle valves to clog
- No butterfly valve
- No float level to maintain
- No float valve to stick

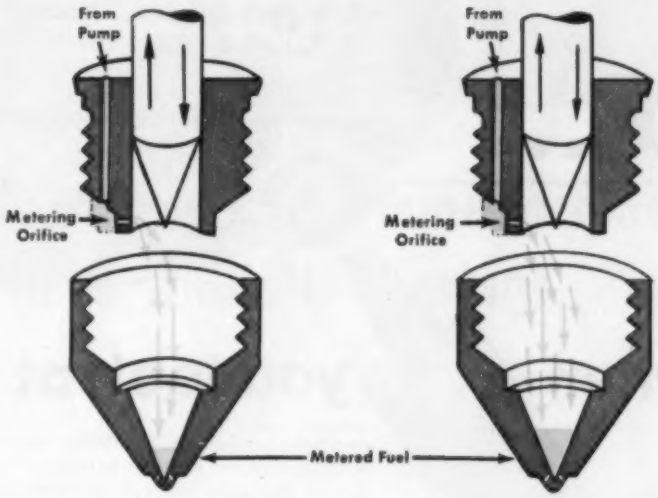
PT advantages over ordinary diesel systems:

- No fuel rack adjustments
- No check valves
- No needle valves
- No helixes
- No distributor discs
- No metering pumps
- No high-pressure fuel lines
- No fuel pump timing

... simpler to work with than gasoline carburetion and ignition

Simplest Fuel Metering Device

The principle is simply that the amount of fuel flowing through a fixed orifice varies according to the amount of pressure on the fuel. Pressure is controlled by the throttle on the PT pump. Fuel flow through orifice is cut off as injector plunger, actuated by engine camshaft, moves down to inject fuel.



When engine is under partial load, fuel pressure is low, and only a small amount of fuel passes through orifice into injector cup.

When engine is under full load, fuel pressure is increased, and greater amount of fuel passes through orifice into injector cup.

Mail this today, and get more PT facts!

CUMMINS ENGINE COMPANY, INC. Dept. CA-11
Columbus, Indiana

Please send me free illustrated folder, "Cummins PT Fuel System."

Name_____

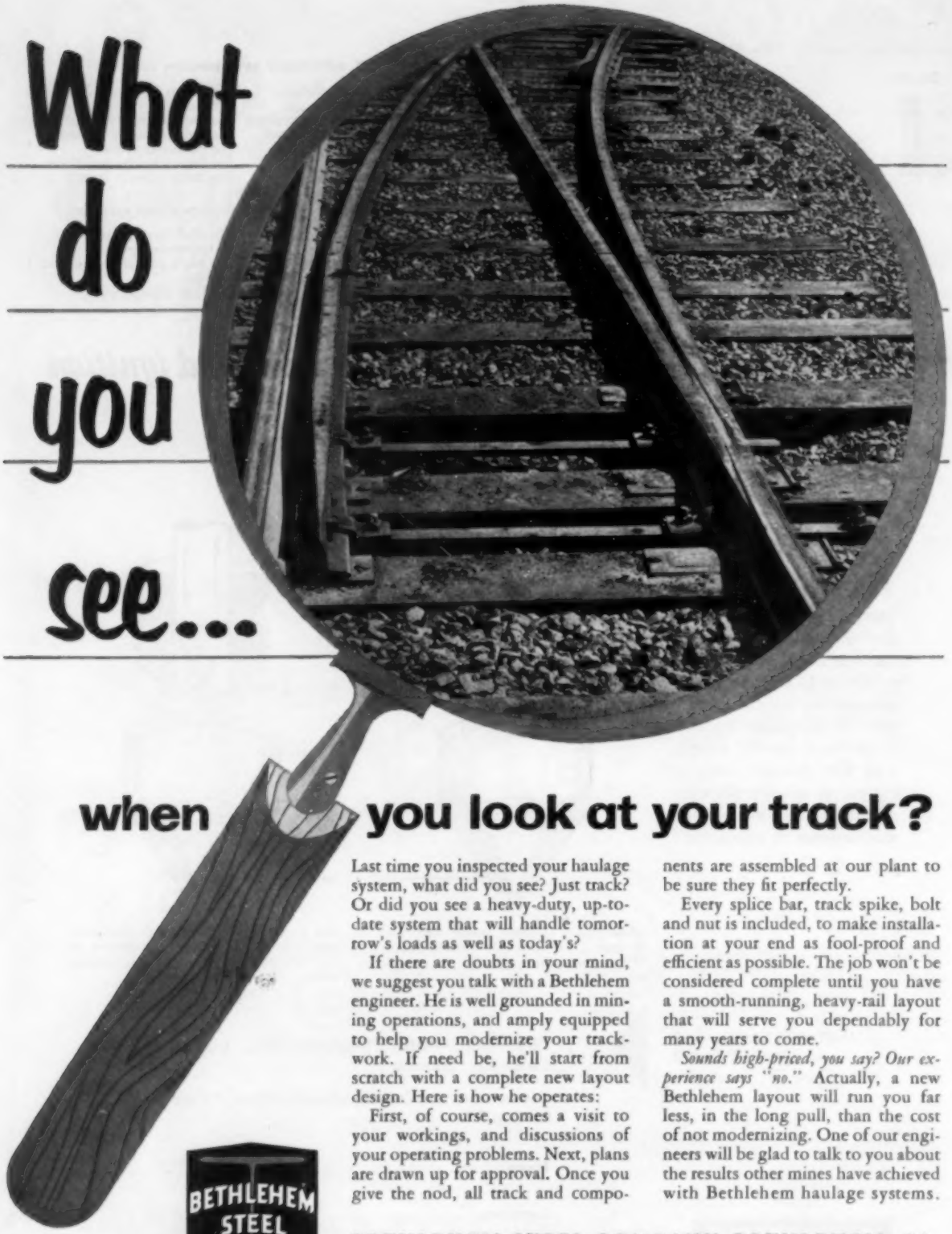
Company_____

Address_____

City_____ Zone____ State_____

CUMMINS

What do you see...



when you look at your track?

Last time you inspected your haulage system, what did you see? Just track? Or did you see a heavy-duty, up-to-date system that will handle tomorrow's loads as well as today's?

If there are doubts in your mind, we suggest you talk with a Bethlehem engineer. He is well grounded in mining operations, and amply equipped to help you modernize your trackwork. If need be, he'll start from scratch with a complete new layout design. Here is how he operates:

First, of course, comes a visit to your workings, and discussions of your operating problems. Next, plans are drawn up for approval. Once you give the nod, all track and components are assembled at our plant to be sure they fit perfectly.

Every splice bar, track spike, bolt and nut is included, to make installation at your end as fool-proof and efficient as possible. The job won't be considered complete until you have a smooth-running, heavy-rail layout that will serve you dependably for many years to come.

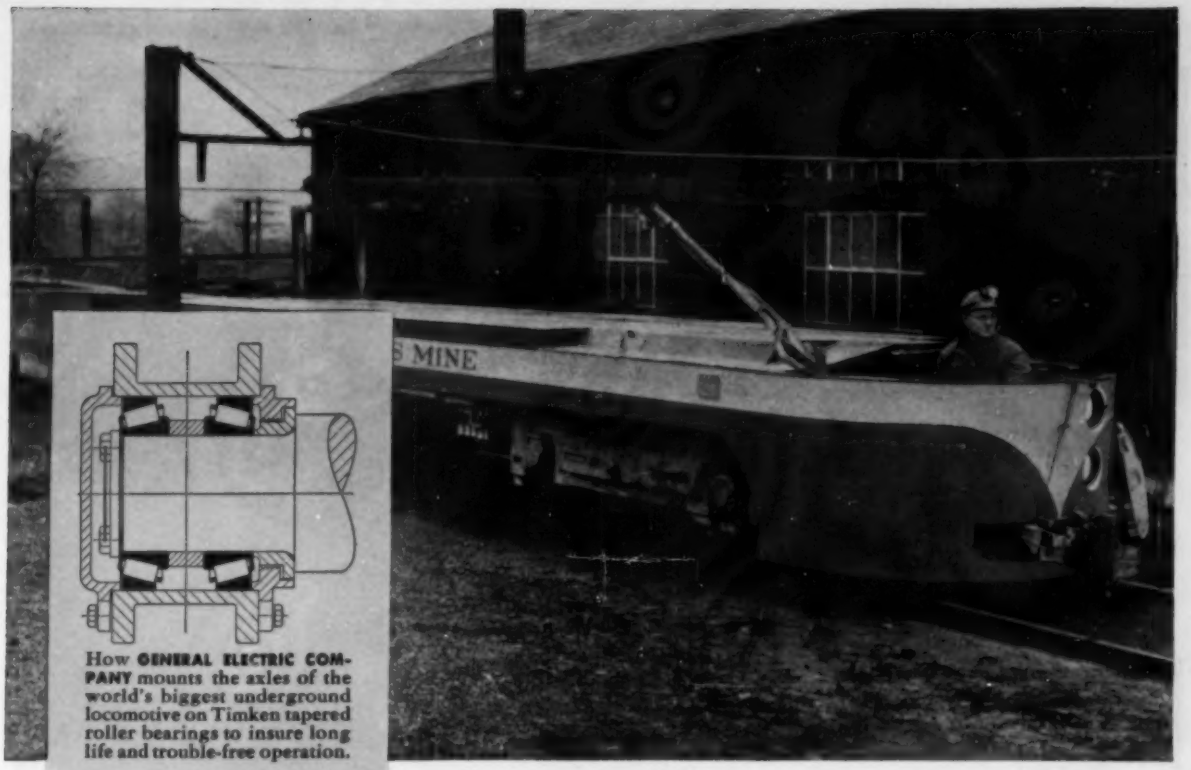
Sounds high-priced, you say? Our experience says "no." Actually, a new Bethlehem layout will run you far less, in the long pull, than the cost of not modernizing. One of our engineers will be glad to talk to you about the results other mines have achieved with Bethlehem haulage systems.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM PREFABRICATED TRACK



How **GENERAL ELECTRIC COMPANY** mounts the axles of the world's biggest underground locomotive on Timken tapered roller bearings to insure long life and trouble-free operation.

World's biggest underground mine locomotive rolls on 16 TIMKEN® bearings

THE world's largest and most powerful underground locomotive, built by the General Electric Company, is now in operation pulling probably the largest coal loads ever hauled by a single unit locomotive. With a rated drawbar pull of 25,000 pounds, this locomotive is capable of pulling 1600 tons, or the equivalent of approximately 110 loaded mine cars, on a straight, level track. To insure against costly breakdowns in the mine and to help the locomotive stand up under the back-and-forth, day-after-day wear and tear of heavy-duty mine operations, General Electric used Timken® tapered roller bearings on the axles.

The tapered construction of Timken bearings lets them take thrust as well as radial loads, without the need for extra thrust plates or bearings. The locomotive takes curves easier. By holding hubs and axles concentric, Timken bearings make closures more effective. Lubricant stays in—dirt, coal, dust and moisture stay out.

Full line contact between rollers and races of Timken bearings provides more than enough capacity for heavy loads.

Be sure you specify Timken bearings in the equipment you buy or build. They give longer life, less friction, minimum maintenance. Always look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

WE MAKE OUR OWN STEEL

The special grade alloy steel which gives Timken bearings their strength and resistance to wear is made in our own steel mills.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

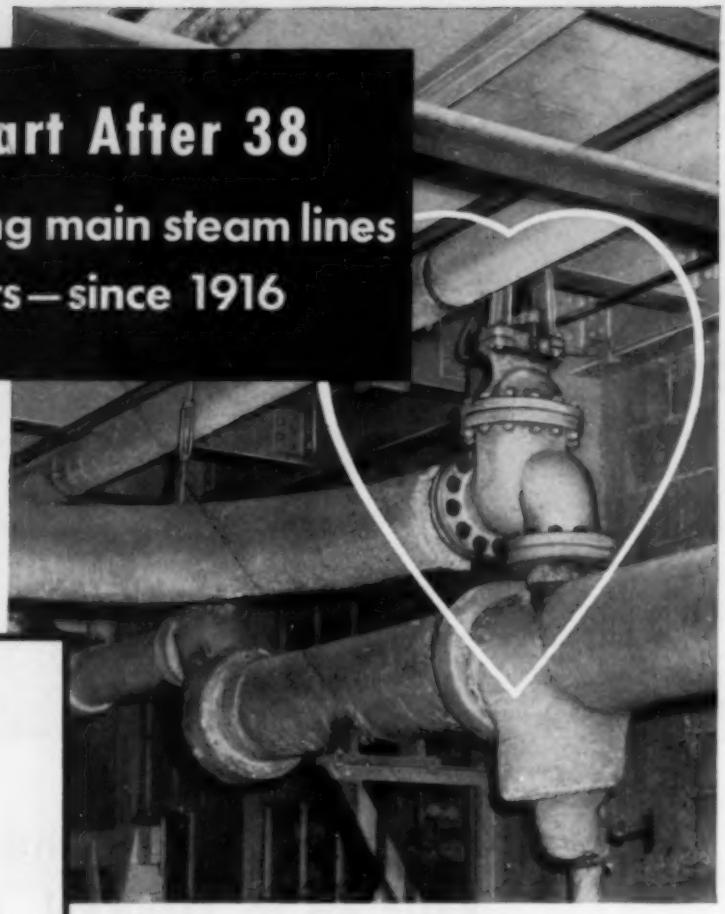
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭

BEARING TAKES RADIAL ⬭ AND THRUST ⬭ LOADS OR ANY COMBINATION ✳

Young at Heart After 38

Crane valves policing main steam lines with no repairs—since 1916



The Installation

In the Lehigh Portland Cement Co. plant at Oglesby, Ill. Original installation of 6- and 3-inch Crane steel valves in boiler-to-turbine steam piping. Working pressure: 160 pounds at about 475 deg. F.

Valve Service Ratings

SUITABILITY:
Hard to Beat

MAINTENANCE COST:
Not a penny for repairs

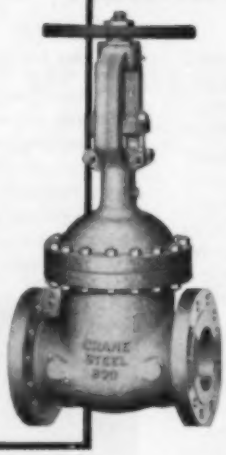
SERVICE LIFE:
38 yr.—still O. K.

OPERATING RESULTS:
Lowest cost steam control

AVAILABILITY:
Complete Crane line of modern patterns

The Valve

Like their 1916 counterpart designs, modern Crane Steel Valves give you performance that wins preference in every industry. They give you the values of steady leadership in steel casting . . . quality design . . . precise manufacturing. And the range of the Crane line in pressure classes, materials, and patterns, meets every need. See your No. 53 catalog, or your Crane Representative.



The Case History

Never, since installed in 1916, have these Crane valves been out of service for repairs. Only care given—and good care, obviously—is prompt repacking of the stuffing box and lubrication when needed. Such attention usually includes a general clean-up.

Neither infrequent operation nor the non-lubricating properties of steam have troubled these valves. They respond to the handwheel with smooth, positive action. High wear-resistance in seating materials keeps them tight as new, year after year.

Buying quality valves from the start assured this amazingly low-cost main line steam control. Today this buying policy is more justifiable than ever. And today as in 1916, better quality valves mean Crane valves.

THE BETTER QUALITY... BIGGER VALUE LINE... IN BRASS, STEEL, IRON

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

The Barber-Greene line is made up of standardized, pre-engineered components including a wide range of Frames, Trusses, Drives, Take-ups, Feeders, Hoppers, Belt Cleaners, Backstops, Brakes, Housings, Walkways, Spouts, Hoods, Gates, Supports, etc.
CONVEY

CONVEY the cheapest way.

CONVEY with standardized units for faster quotation and delivery.

CONVEY with pre-engineered components, eliminating special engineering time and expense.

CONVEY with factory-assembled, factory-aligned components for faster erection, and easier future alteration.

Ask for the Barber-Greene 192-page Conveyor Catalog.

54-40B-PE

Barber-Greene

AURORA, ILLINOIS, U.S.A.

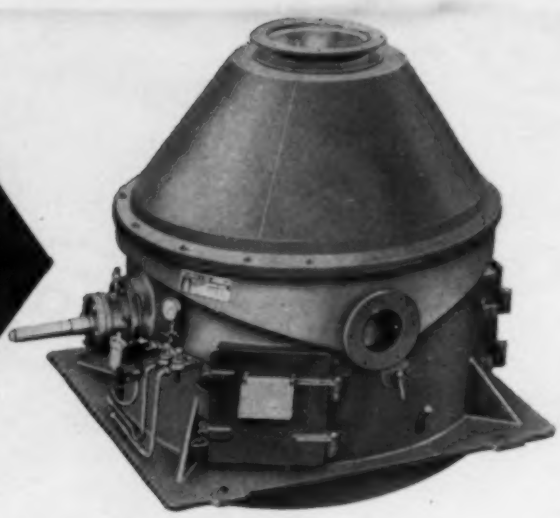
BG

WRITE for INFORMATION

descriptive literature . . . sound movies

cost studies . . . nearby job inspection . . . plant layouts

Only The 1954
REINEVELD FINE COAL DRYER
Gives You ALL These
EXTRA-PRODUCTION FEATURES



No other centrifugal coal dryer can give you more than 3 of these important operating advantages, all of which are now standard items on the new Reineveld machine.

Examine these features, one by one. See for yourself why these new advantages, combined with Reineveld's world-wide record for quality workmanship and durability, make the Reineveld Centrifugal Dryer, more than ever, your best buy in coal dryers.

SPEEDS TO 900 R.P.M.
Centrifugal drying power (G's) increased 43%, resulting in higher tonnages at lower cost.

INTEGRAL LUBRICATION SYSTEM
100% self-contained. No outside tanks. Dip stick to check oil supply. Magnetic filter to keep chips and burrs out of system.

ONE PIECE SCREEN PLATE
Screen can be replaced by one man in 20 minutes with no cutting, no bending, no overlapping.

TOTALLY ENCLOSED DISTRIBUTOR CAP
Reduces power consumption and degradation, increases recovery and screen life. It also eliminates an expensive wear ring.

VERTICALLY ADJUSTABLE SCRAPER DRUM
Permits adjustment of the clearance between screen surface and scraper blades without changing blades. Results in more efficient operation and fewer blade changes.

VARIABLE SPEED DRIVE
Does not require a specially-built motor or one that is connected directly to the driving shaft. Motor is positioned so that neither feed, effluent nor cake can come in contact with it. Basket speed easily changed.

SOLID BRONZE BASKET
Impervious to corrosion. Will not break under abnormal forces as cast iron or semi-steel baskets will.

REVERSED CASING WEBS
Eliminates any possible build-up of fine coal in the main case which could lead to shaft and gear failure.

COMBINATION INSPECTION, CLEANING AND SAMPLING DOOR
Can be opened on hinges, removed completely or opened for sampling while machine is running without removing a single bolt.

ALUMINUM DOORS AND COVERS
Further simplifies machine maintenance. Pieces can now be handled easily by one man.

POSITIVE TRANSPORT OF MATERIAL THROUGH MACHINE
All material is transported across the dewatering surface and through the machine. Reineveld does not rely on centrifugal force alone to perform this function.

Cyclone Thickeners
Thermal Dryers
The Drying Dutchman
Reineveld Centrifugal Dryer
Thorsten Coal Sampling Systems
Rotary Mine Car Dumpers
Coal Crushers
Coal Preparation Plants
Bradford Breakers

Heyl & Patterson, Inc.
"SINCE 1887"
55 FORT PITT BLVD. PITTSBURGH 22, PA.

Turnpike tests Transmissions

Contractor D. W. Winkleman is building two stretches of the Ohio Turnpike . . . working in rough, wet cuts, his ten Model C Tournapulls are doing a major share of the 7,300,000 cubic yard excavating job. On this operation the distance from cut to fill is over a mile and a half . . . the Tournapulls make the round trip of over 3 miles in just under 22 minutes. Fuller Model 5-A-1120 Heavy-Duty transmissions *are putting every "Horse" of the 186 hp diesels into the job.* In this contest of "scrape . . . load . . . haul . . . return" Fuller 5-A-1120 transmissions gear the Tournapulls with the *right ratio* for each load and grade condition.

The performance of Fuller geared equipment working in every major industry in *all types of on- and off-highway service* has been so outstanding that leading truck and equipment manufacturers *standardize on Fuller transmissions* in their vehicles.

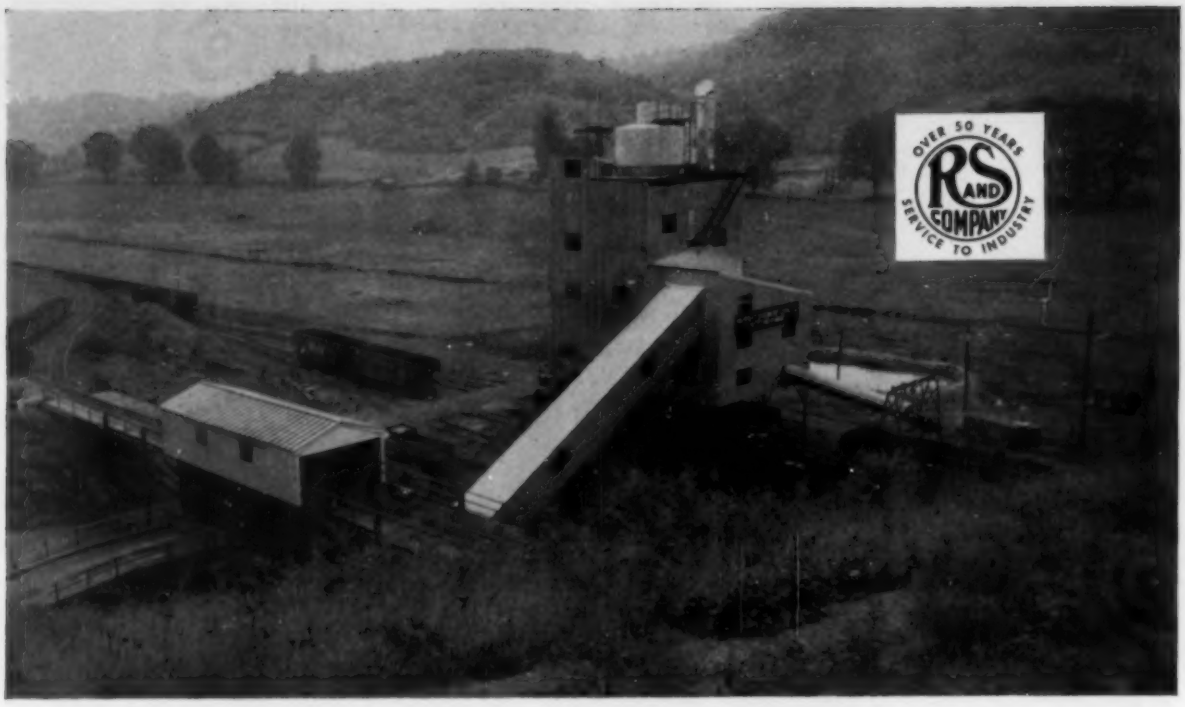
From more than 110 different models available for rubber-tired equipment from 100 to 400 hp; engines from 330 to 1440 cubic inches . . . there is a transmission *designed with your job in mind.* Specify a Fuller transmission for your equipment.

where horsepower *really* goes to work

Fuller TRANSMISSIONS

FULLER MANUFACTURING COMPANY (Transmission Division), KALAMAZOO, MICHIGAN

Unit Drop Forge Division, Milwaukee 1, Wisc. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Western Dist. Branch (Sales & Service, All Products), 641 E. 10th St., Oakland 6, Cal.



A functional job

for a progressive independent operator

Roberts & Schaefer engineers approached the plans for this 150-ton per hour processing plant for the Scott #4 Mine of Reppert Fairmont Coal Co. with the same enthusiasm and thoroughness that are devoted to all engineering studies — whether involving 50 or 1000 tons per hour capacity. Regardless of the size of a given project, it receives the full benefit of our more than fifty years of knowledge and experience.

The preparation plant for the Scott #4 Mine at Buckhannon, W. Va., utilizes a combination air and water cleaning process to secure the most economical and satisfactory end results. It incorporates the R & S Airflow Cleaner which has proved so successful in air washing coal and the R & S Package-Unit Hydro-Separator for wet washing coarse coal. The completed plant is now in operation and is functioning to the entire satisfaction of both designers and owners.

This is still another example of the ingenuity and skill of Roberts and Schaefer engineers. Our organization has engineered, constructed and equipped a great number of successful preparation plants of all types both in this country and abroad. Take advantage of our experience when you require a one-source solution of your coal preparation problems.

ROBERTS & SCHAEFER COMPANY

Engineers and Contractors

130 North Wells Street, Chicago 6, Illinois

New York 19, N. Y.—254 West 54th Street
Pittsburgh 22, Pa.—Henry W. Oliver Bldg.
Huntington 10, W. Va.—P.O. Box 570
Hibbing, Minnesota—P.O. Box 675
Foreign Department: International Mfg. & Equipment Co., Inc.
220 Broadway, New York 38, N. Y., U. S. A.

Walking Drags Go For Longer Walks Without Replacing...

Tuffy® DRAGLINES

Tuffy Scraper Rope
Flexible enough to withstand sharp bends . . . stiff enough to resist looping and kinking when slack . . . tough enough to resist drum crushing!

Tuffy Dozer Rope
Designed to take the punishment of small winch drums and small sheaves . . . the shock of blade manipulation under toughest going!

Tuffy Slings
9-part, machine braided wire fabric construction is extra flexible, extra strong. Kinks or knots easily straightened out without material damage.

Tuffy Slusher Rope
A triangular 3 strand non-collapsing construction that doesn't drum crush, resists abrasion longer and has great line pull strength.

The dragline is a relatively small part of the huge investment in a walking drag. But too frequent dragline replacement can mount up to a sizeable part of maintenance.

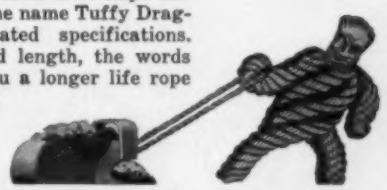
In three important ways, Tuffy Draglines are constructed to run longer—handle more yardage before replacement is necessary.

1st To resist abrasion, the wires of tough steel in the outer lays of Tuffy Draglines are larger. They present a much larger wearing surface. It takes longer to wear them down.

2nd The inner structure of Tuffy Draglines is engineered to fully support the big wearing surface and add greatly to the overall strength of the rope as a whole—no loafing or weak parts.

3rd Tuffy Draglines are so engineered as to develop the maximum flexibility needed for accurate casting. This lets the operator come up with more bonus loads—fewer recasts.

Ordering dragline from any Union Wire Rope distributor is a simple matter. The name Tuffy Dragline eliminates all complicated specifications. Along with the diameter and length, the words Tuffy Dragline will bring you a longer life rope for any drag bucket machine.



union Wire Rope **corporation**
2130 Manchester Avenue Kansas City 26, Mo.

Specialists In High Carbon Wire, Wire Rope and Braided Wire Fabric

Mining equipment can do more work when it's built with

USS High Strength Steel

This Big Bucket can scoop up 30 cu. yds. of coal or overburden at one bite. This means it has to take a lot of pounding and abrasion. And it can—because it was built with USS TRI-TEN steel which insures high resistance to impact and shock, even at low temperatures, along with high strength and good welding properties.

Big-capacity COR-TEN steel cars in West Virginia mine carry 3 times the usual car load. These 15-ton COR-TEN steel cars are typical of the modern equipment and modern materials being used to cut coal mining costs. USS COR-TEN steel floor plates are ⅜" thick, side and end plates are ¼" thick—same gauge as used in carbon steel. This rugged construction, which adds no weight but greatly increases strength and durability, pays off in fewer break-downs and longer life.

Built with USS MAN-TEN steel this 28 cu. yd. capacity hydraulic dump truck body—one of the world's biggest—can carry 45 tons of coal or overburden, can dump a full load in 20 seconds and has a road speed of 32 miles per hour. Here's real ability to deliver the goods.

WITH USS High Strength Steels you can give your mining equipment the rugged durability it needs to stand the punishment of today's high speed mining operations.

These famous "steels that do more" will keep your equipment *in* operation, moving tonnage, and *out* of the maintenance shop where repairs and replacements cut into profits. For USS COR-TEN, USS MAN-TEN and USS TRI-TEN steels have a 50% higher yield point than ordinary carbon steel. In addition to greater strength they provide higher resistance to fatigue, wear, abrasion and impact.

These superior physical properties of USS High Strength Steels can be used to materially increase the strength and life of equipment without increasing its weight. Conversely, in some applications it is possible to use these tough steels in thinner sections to reduce weight without reducing strength, or to increase the size and capacity of equipment, without increasing its weight or the power needed to operate it.

Moreover, if your mining equipment must work in sub-zero temperatures, or under unusually corrosive conditions you can build it with a USS High Strength Steel that will resist these destructive forces to keep it on the job and prolong its life.

For more information or application data about USS High Strength Steels phone or write our nearest office.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS HIGH STRENGTH STEELS

USS COR-TEN • USS TRI-TEN USS MAN-TEN • USS A-R STEEL

A-492

UNITED STATES STEEL

The Facts Behind Allis-Chalmers Leadership in Torque Converter Tractors

***Fourteen* years of experience . . . *eight* years with production models . . . *thousands* of torque converter tractors out in the field . . . *millions* of operating hours on every kind of work.**

TODAY'S tractor owners have given their "stamp of approval" to torque converter drive—as a key factor in the new standards of tractor performance they need for today's closely-bid jobs. Here's why —

Automatic Matching of speed and pull to load and terrain conditions . . . more dirt moved every hour, day in and day out.

Hydraulically cushioned protection for engine, clutch, transmission, rear end. The entire tractor lasts longer! That means less downtime, lower maintenance costs, more profit.

Operators love it! Allis-Chalmers torque converter tractors are so easy to handle (most shifting is eliminated) that operators do a top-notch job all day long.

Yes, the industry's most experienced men are demanding and buying torque converter tractors . . . *and in this, Allis-Chalmers leads the way.*

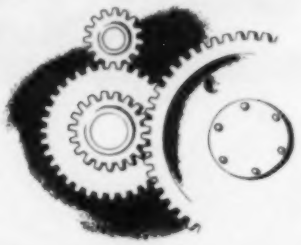
But, remember, you don't buy just one feature . . . you buy a *tractor*, with torque converter drive designed as a matched part of the entire machine. This advanced drive is only *one* of the many outstanding features that have switched so many leading contractors to Allis-Chalmers tractors. So . . .

Check all these features before you buy!

All-Steel Box-A Main Frame with one-piece, rear-end housing gives improved weight distribution, soaks up shocks, provides better equipment mounting, greater servicing ease . . . longer equipment life.

Service Simplicity of Unit Construction — Power drive components can be easily removed, repaired or replaced without disturbing adjacent parts . . . saving time and money.

"Live" Sprocket Shafts — "Live" shafts with straddle-mounted bearings permit small, more serviceable seals. Double reduction final drives with smaller gears and shorter, heavier shafts mean extra ground clearance, better alignment, longer life.



1,000-Hour Lubrication — Tapered roller bearings and positive seals on truck wheels, idlers, support rollers and final drives extend lubrication intervals, cut downtime.

Hydraulic Booster Steering — Gives operator small tractor maneuverability with new ease. In addition, self-energizing brakes which take hold with a firm, uniform grip, provide exact control and sure safety with less pedal pressure.

True-Dimension Track provides maximum ground contact . . . plus the right design, the best steels for every job condition . . . heat-treated for long life with the industry's newest, most complete facilities.

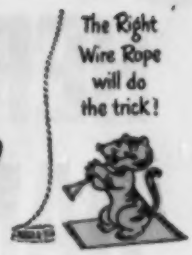
Oil-Enclosed Track Release Mechanism — Operates in oil, seals out dirt and moisture, always in working condition to provide positive protection.

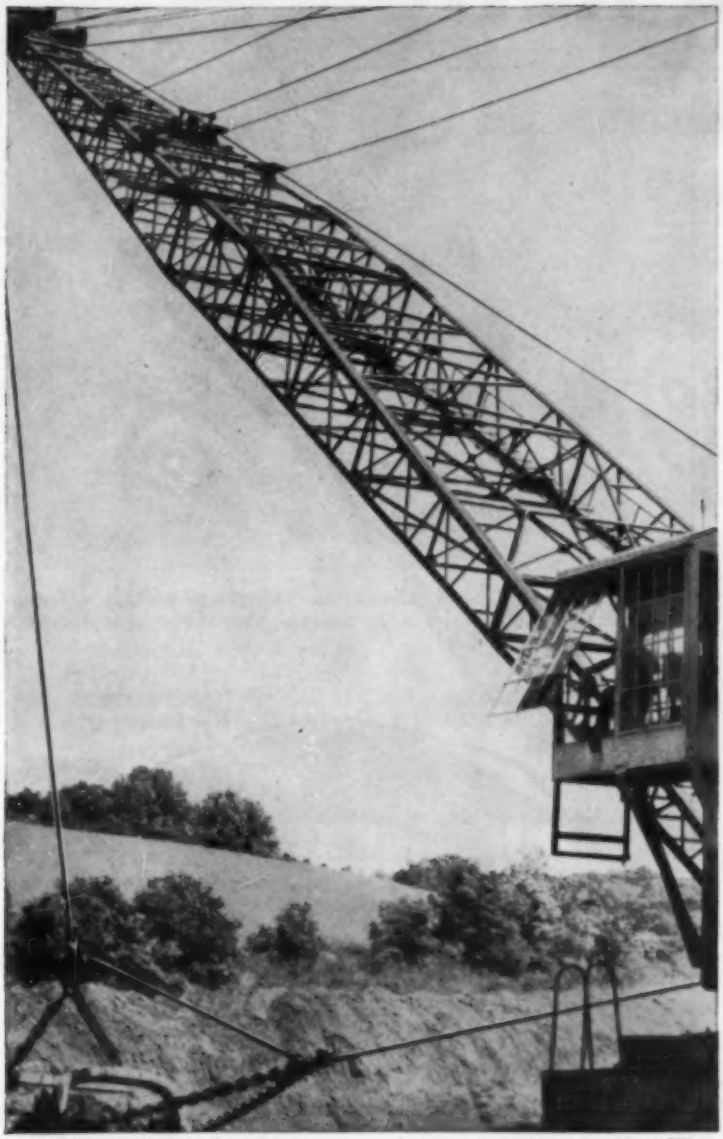
See your nearby Allis-Chalmers dealer now for the full story. Whether you're interested in a big tractor like the HD-20 or HD-15 . . . or the smaller HD-9 and HD-5, you can be sure of getting the most advanced tractor in the business, because Allis-Chalmers is the leadership line.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

TROUBLE-FREE SERVICE around the clock from Tiger Brand Drag Rope





ASSURE YOURSELF of good service from your wire ropes—consult an American Wire Rope Engineer regularly.

ONE of the largest coal companies in Pennsylvania gets excellent service from Tiger Brand Wire Rope. On this big dragline, for example, 2¼" Tiger Brand Drag Rope lasts for 8 to 12 weeks, and 1⅜" Tiger Brand Hoist Rope lasts 4 to 6 months. This is good service, because these ropes work 24 hours a day, 6 days a week, every week of the year.

As a result of consistently good service records like these, many such operators use Tiger Brand Wire Rope exclusively on all their excavating machinery.

Like hundreds of other companies that do a lot of excavating, you will find that once you start using Tiger Brand Wire Rope, you keep down rope costs, keep down rope trouble, and *keep on using* Tiger Brand.

For a list of Tiger Brand Wire Ropes and the jobs each one can do best, send the coupon.

FREE ROPE BOOKLET

American Steel & Wire
Dept. J-114, Rockefeller Building
Cleveland 13, Ohio

Please send me, without obligation, a copy of your helpful wire rope selection guide, "The Right Rope for the Job."

Name.....

Company.....

Address.....

City & State.....

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

USS

UNITED STATES STEEL

HERE'S REAL MATERIAL HANDLING NEWS

New STEARNS 2-coil magnetic pulley removes more tramp iron than larger units on many conveyor operations—yours may be one

Stearns now offers a powerful new electromagnetic pulley that provides exceptional tramp iron removal *throughout the entire load mass.* Two-coil design produces a magnetic field that is deepest at the center of the conveyor belt where load is heaviest. The area of magnetic attraction is the same general shape as the load on a conveyor operating under standard conveyor practices.

Pulley costs less

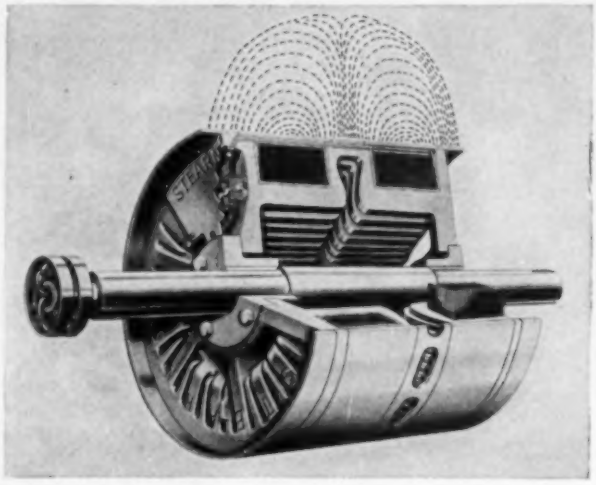
Because of the nature of the magnetic field, smaller pulleys costing less, can now be used on jobs where larger units were formerly needed. An examination of data on a number of proposed installations showed that, in the majority of the cases, the recommended new 2-coil pulley is of smaller diameter than a 3-coil pulley handling the same job.

Get all the facts on this new magnetic pulley. Find out how it simplifies pulley selection. Write for bulletin 303-C.

SIMPLIFIED PULLEY SELECTION METHOD*

Because this pulley fits right into recommended conveyor standards for speed of belt travel and depth of load for various types of materials, it is far simpler to select the right pulley than ever before. Stearns provides new selection tables in Bulletin 303-C that now make it possible for you to select the right size unit for your job even before you consult our sales engineers.

*Copyrighted 1954 Stearns Magnetic, Inc.



Cutaway showing 2-coil construction. This design provides a deeper magnet field at the center of the pulley — a pattern which conforms to normal load conditions.

Diagram showing magnetic field for 2-coil, 36-in. dia., 42-in. wide pulley. Note how magnetic field blankets entire load.

Diagram of same size 3-coil pulley. Note how center of load extends above magnetic field. Conveyor would require a larger pulley operating at slower speed in order to do an effective tramp iron removal job.

1106

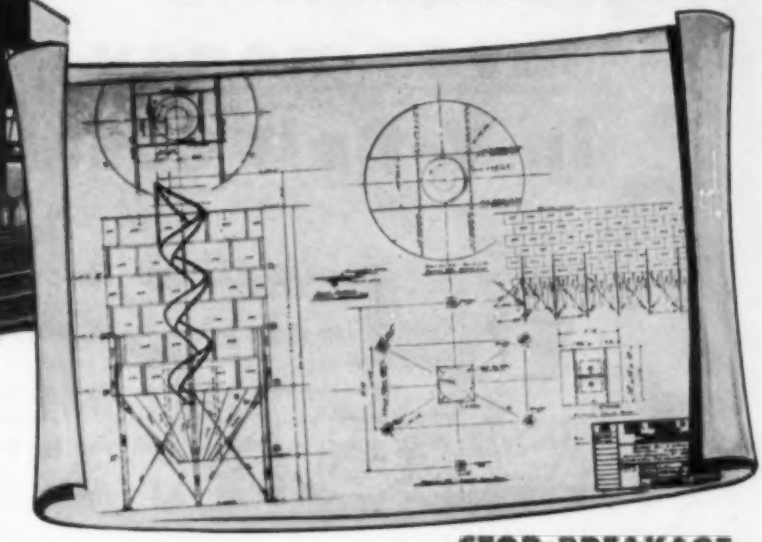
MAGNETIC EQUIPMENT FOR ALL INDUSTRY

STEARNS MAGNETS

STEARNS MAGNETIC, INC., 661 S. 28th St., Milwaukee 46, Wis.

Now...equipment for HANDLING, STORING *and* PREPARING *coal*

engineered to your individual needs...



THIS INSTALLATION of a Holmes Lowering Spiral and Coal Storage Bin (Steel Type) was made at the Jamison Coal & Coke Co., Mine 21, Hostetter, Pennsylvania.

It was preceded by a careful survey of the requirements and was *individually engineered* to do the job for which it was intended.

STOP BREAKAGE LOSSES WITH HOLMES LOWERING SPIRALS

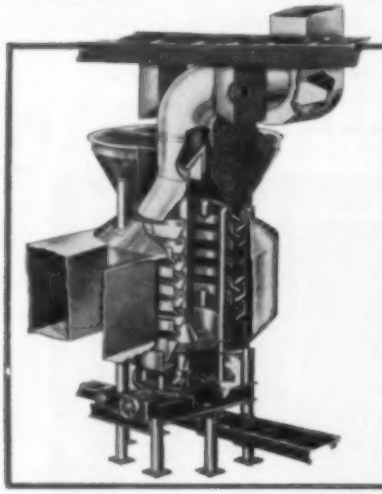
- **No droppage to degrade your coal**
- **No wear and tear on bins**
- **Costs nothing to operate** (gravity operated)

Robert Holmes Lowering Spirals are designed to lower material through the use of centrifugal force, thus eliminating the need of an inside retaining lip. Each spiral is formed like a well-banked race track. The coal automatically slows down when it reaches the "safe" speed limit, regardless of the distance of travel.

As there is no retaining lip, the coal slides gently off onto the peak of the pile to form a natural angle of repose. In this way, the coal is spread out uniformly . . . a real advantage where segregation is a problem.

Lowering spirals are essential to proper handling in surge bins, run-of-mine storage bins and pockets, mine retail sales bins, and consumer storage systems.

For free literature and complete details write Dept. A-35.



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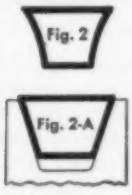
Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)

(U. S. PAT. 1813698)



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Typical Gates Vulco Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer belt wear.

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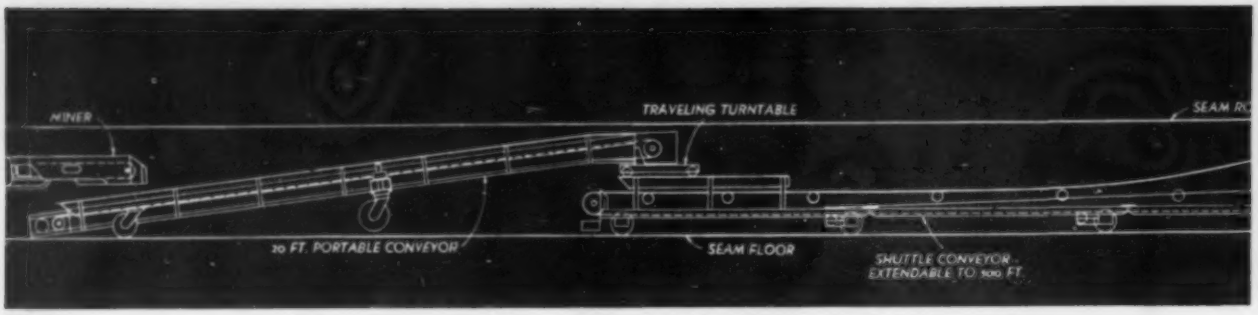

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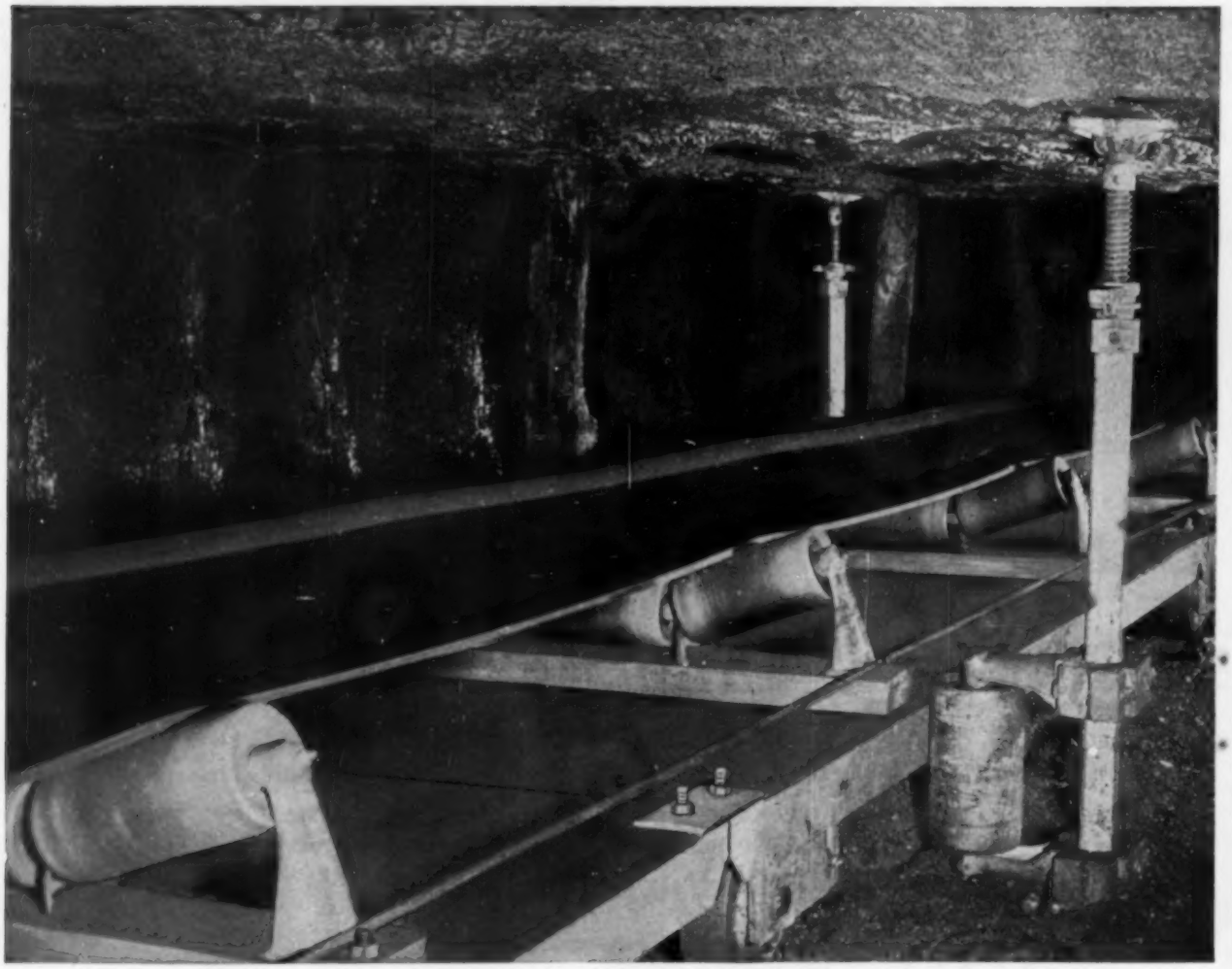

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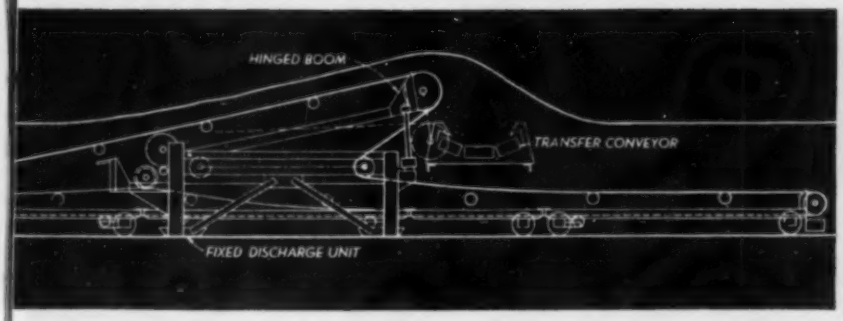

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It's The Hewitt-Robins Mine Type Shuttle Conveyor With Fixed Tripper

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This versatile unit is the key to truly continuous mining. The Shuttle Conveyor is both extendable and retractable—can follow the progress of mining and at the same time maintain a fixed transfer point through a fixed tripper and is extendable to 600 or 700 feet.

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Remember, when it comes to any type of belt conveyor or complete belt conveyor systems, only one company—Hewitt-Robins—can assume single and unified responsibility for successful operation. For only Hewitt-Robins designs, engineers, manufactures and installs both the belt and machinery.

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that will help you cut handling costs and increase operating efficiency.

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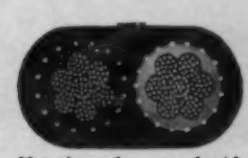
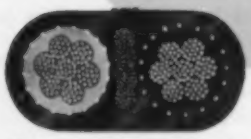
Give Rome 60 the *Rough*

Rugged, well-protected Rome 60 cables stand up—even under tough conditions encountered in low seams, rooms and entries.



Note how the open braid around each conductor firmly interlocks conductors to the sheath . . . prevents twisting, loosening and pulling.



The grounding conductor is solidly embedded in a Neoprene "web" giving exceptional protection against "shorts" and mechanical injury, yet maintaining flexibility and minimizing conductor distortion and fatigue.

Cable Jobs !

Conductors "geared" to Neoprene sheath—prevents failure from twisting, bending or pulling . . .

As the fall is loaded and moved out, you can't stop to worry about cables being twisted, pulled or crushed. *And with Rome 60 Mining Cables you don't need to.*

A strong reinforcing braid interlocks . . . actually "gears" individual conductors to the Neoprene sheath, providing 360 degrees of balanced adhesion, preventing failure from twisting, bending or pulling of conductors within the sheath. And this open braid construction permits maintenance of full sheath thickness with no thin spots.

A tough, resilient Neoprene webbing between the power and grounding conductors assures maximum flexibility, great resistance to impact and sure protection against short circuits . . . no fibrous separators to rot, deteriorate or wick moisture.

Corrosion, Abrasion, Flame Resistant

Molded in lead to a tire-like toughness, the Neoprene sheath is highly resistant to acids, alkalies, oils, abrasions, moisture and flame. The specially compounded, heat-resistant rubber insulation is suitable for operation at 75° C., providing for maximum overload protection.

To assure less "down time," higher tonnages and lower production costs, standardize on dependable Rome 60 Mining Cables—designed for long, tough service. P-105 BM molded in the Neoprene sheath is your assurance of compliance with Federal and Pennsylvania Safety Codes.

Rome 60 Type SO Cord

- **Neoprene Sheathed**
- **Long Service Life**

Specially made for rugged mine service, these cords last longer and keep replacement costs at a minimum.

The all-resistant Neoprene sheath assures utmost protection against mechanical abuse. Maximum flexibility results from precise stranding of fine wires. The heat-resistant, specially compounded rubber insulation gives high electrical stability. Longitudinal fillers provide increased protection against crushing and tensional strain.

Manufactured in full conformity to State of Pennsylvania and Bureau of Mines Safety Codes. Rome 60 Type SO Cord is marked P-105 BM.

The Rome 60 Line Includes:

- Type SO Portable Cords
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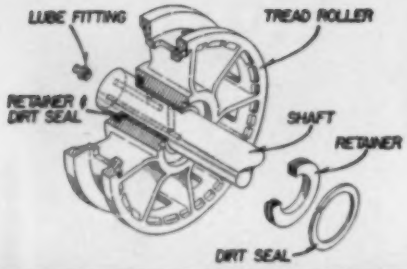

LIMA DIRT SEALS CUT DOWN-TIME AND MAINTENANCE COSTS

This LIMA shovel, demonstrates the importance of LIMA'S dirt seals and grease retainers.

In such work, abrasive material which wears out the bushings and shafts of ordinary shovels is excluded. LIMA seals the lubricant in and dirt out, thereby reducing friction and prolonging the life of bushing, roller and shaft.

COMPARE! No other machine gives you as much as LIMA!

1. Bronze bushings in tread, idler and drive rollers are protected by piston-type dirt seal rings and retainers.
2. All gears, smaller parts and shafts which are subject to extra wear are flame or induction hardened for longer life.
3. Main machinery is placed well back of center of rotation to eliminate excess counterweight.
4. Anti-friction bearings, used at all important bearing points, reduce destructive friction, fuel consumption and lubrication requirements.
5. Big capacity drums and sheaves lengthen cable life by reducing the need for double wrapping and sharp bends in cable.
6. Full air controls on travel, hoist, swing and boom hoist, result in smoother, more precise operation, minimum maintenance and less operator fatigue.
7. Torque converter (optional) automatically adjusts speed to load requirements, minimizing shock loading, making performance smoother and faster.
8. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts to keep your LIMA on the job continuously.

COMPARE and you'll specify LIMA for shovels (¾ yd. to 6 yds.), cranes (to 110 tons) and draglines (variable).

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INCREASE PROFITS IN EVERY INDUSTRY

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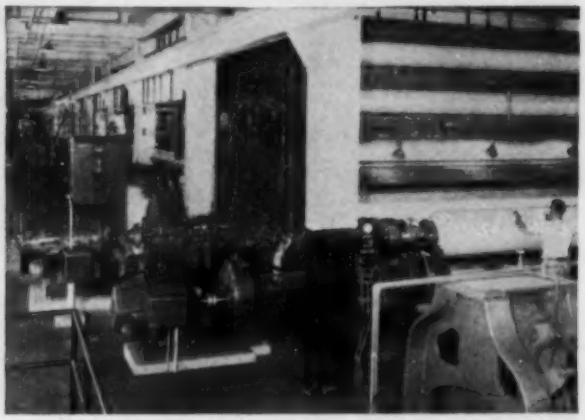

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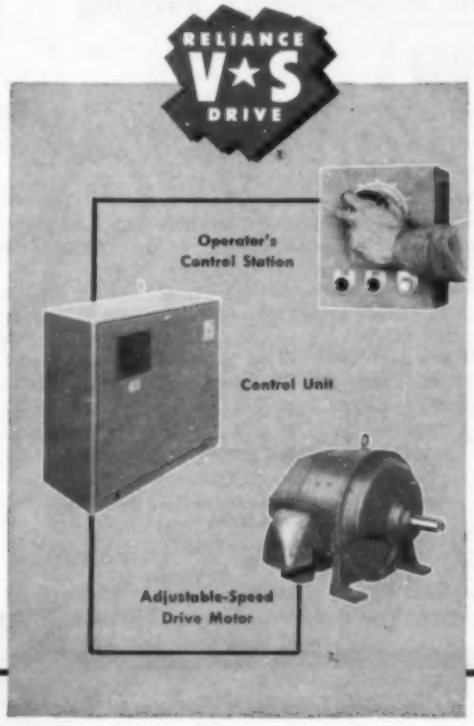

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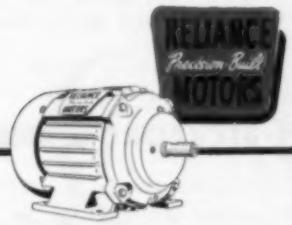
These Tools of Automation can most efficiently lower your costs, because they're designed and applied to *your* specific situation. Reliance Application Engineers are backed by nearly 50 years' experience in perfecting the drive systems that can help you attain the degree of automatic production you require. For further information, write for the new booklet, "The Tools of Automation". A-1497-C



RELIANCE ELECTRIC AND ENGINEERING CO.

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To light Safety Fuse from one point in Secondary Blasting use ENSIGN-BICKFORD *Quarrycord*

Now you can use safety fuse and caps in multiple blockhole secondary blasting, with the added features of remote firing.

The lighting device is Quarrycord — a flexible water-resistant cord specially constructed to burn fast, at a speed of about one foot per second, with an external flame at the zone of burning. It is not affected by stray electrical currents, and is ideal for use during the thunderstorm season.

Fuse and caps are prepared in the usual way, with the addition of a connector crimped on the free end of the fuse. This connector protects the fuse powder train during rain storms, and is slotted to provide a firm, positive connection for the Quarrycord.

After the blockholes are loaded, the Quarrycord is run from hole to hole, and inserted into the slot of each connector. The top of the connector is pressed down over the Quarrycord, locking it firmly in place. The free end of the Quarrycord is then run out to a spot where it can be easily lighted.

Plan your Quarrycord hookup so that the fuse in each blockhole is lighted before the first hole goes. Several groups of boulders can be prepared in this manner, and when all is in readiness, the blaster lights the Quarrycord for each group, and walks to a place of safety. O-1

THE ENSIGN-BICKFORD COMPANY
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Ensign-Bickford Quarrycord is packed on spools in 500 ft. lengths. See your explosives supplier or write us.

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for lighting Safety Fuse in Secondary Blasting

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

NOVEMBER, 1954

IVAN A. GIVEN, EDITOR

Resurgent Coal

SIGNS ARE MULTIPLYING that bituminous coal has passed through the low point of this particular downswing and is now in a new cycle of increasing production. In fact, it now appears that the low point was the second quarter of this year, with an output of approximately 90 million tons. Production has been rising since that time, and that rise is expected to continue, barring a major business upset. "Why, where and how much" are the subjects of the roundup appearing on the next four pages of this issue of *Coal Age*. It finds coal probably better prepared than ever to make the most of the opportunities which this expansion in business will bring.

Still Basic

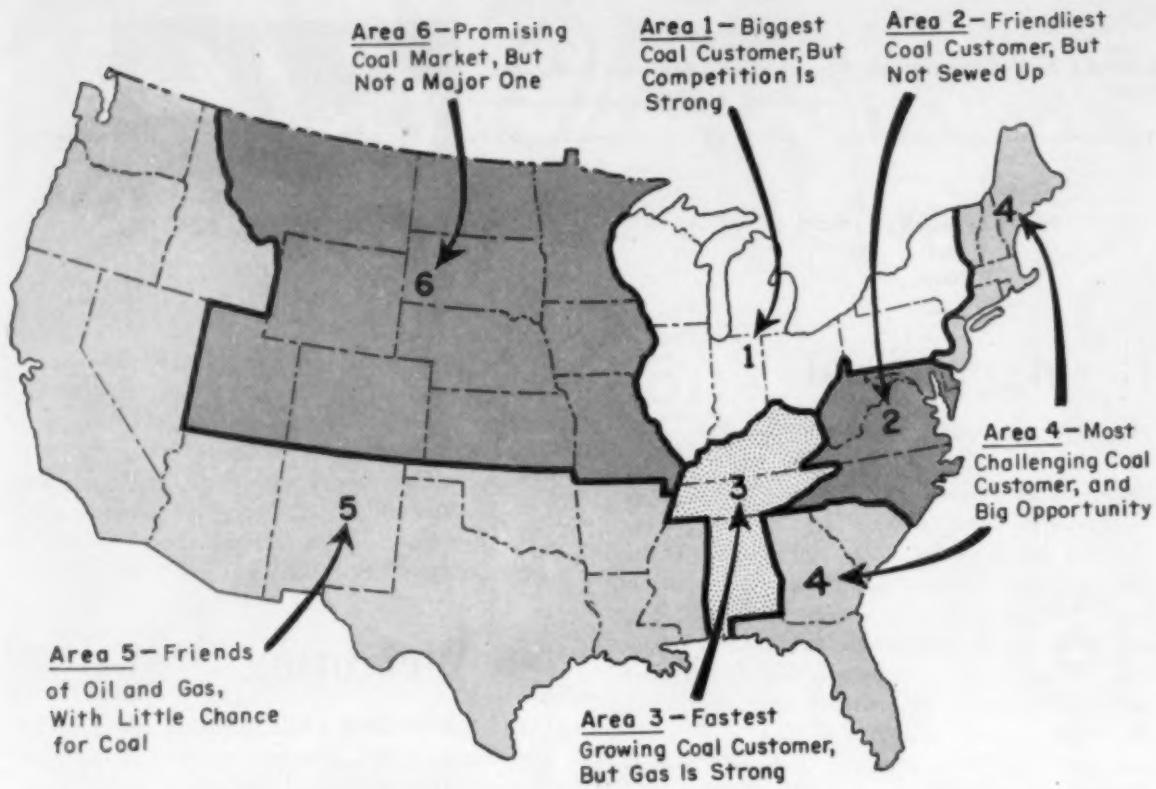
"IF YOUR COST ISN'T RIGHT, your price can't be right." In this statement lies both a major problem and a major opportunity for coal. The right price means an automatic choice over competition when other things are equal. And, if it is low enough, the right price can even offset certain advantages that competition enjoys because of its gaseous or liquid nature. Thus, the right price is the soundest possible foundation for an effective, hard-hitting merchandising program.

"Right price" of course means a cost that will provide a reasonable profit while still well under anything competition can offer, especially in the heavy industrial, commercial and utility fields, which are becoming more important income-wise as well as tonnage-wise. Since labor still is the major item in cost, it naturally is the major target in cost-cutting programs, especially since it now represents 50 to 60% of the mine price—and can be cut to 25 to 30% at most mines. This reduction can be accomplished not with miracle machines and miracle methods to be developed in the future, but with equipment and methods already in existence. Proof is provided by the records of a fair number of mines that have reached or are approaching these figures. This means up to a dollar or more to apply to improving coal's competitive position and boosting the profit margin. Thus, cost-cutting is still basic, and attainment of a low cost is the best of all methods of reinforcing the other steps being taken to build coal markets.

No Weighting

COAL'S PRESENT EMPHASIS on the need for government action to restore sound and fair competition is in substantial measure a result of reaction to the activities of government itself in favoring or creating competition. These activities range all the way from supporting proposals which increase the labor cost of coal to direct production of hydro power in competition with coal-fired plants. As an example, a federal agency is now attempting to prevent the free rise of wellhead natural-gas prices, thus favoring the expansion of natural-gas pipe lines not only at the expense of coal—and also oil—but at the expense of the gas owners as well.

Cost, quality and service must always be coal's basic reliances in facing competition, but if they are to be effective they must have free play—in other words, no weighted scales. Without this weighting against coal over the years, there probably would have been no need for redress, particularly on such a wide scale, and quite likely no need for the potentially hazardous course of suggesting regulation of the sale and use of a competitive product, which might later serve as the precedent for attempting to regulate coal to a similar degree. Concentration on the elimination of government roadblocks thus becomes a necessary item in the coal-mining program, and the more such elimination can be accomplished the better the opportunity for progress through cost, quality and service. Congress is a good starting place.


Area 6—Promising Coal Market, But Not a Major One
Area 1—Biggest Coal Customer, But Competition Is Strong
Area 2—Friendliest Coal Customer, But Not Sewed Up
Area 4—Most Challenging Coal Customer, and Big Opportunity
Area 5—Friends of Oil and Gas, With Little Chance for Coal
Area 3—Fastest Growing Coal Customer, But Gas Is Strong
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COAL'S OPPORTUNITIES among utilities are appraised in map that shifts conventional FPC regional boundaries.

Coal Resurgent

Livelier activity among fuel users, plus growing favor for coal, point to a real upturn in bituminous. The industry, slimmed down to bone and muscle, stands ready to grasp its new opportunities.

THIS YEAR, 1954, will not end up as a good year for bituminous.

But the industry has survived worse years. It will survive 1954 as well. In fact, signs today indicate that coal's long-promised upturn is in the making and that this year will be the last in which mere survival is a problem for the industry.

How bad off is the industry today?

Production—Bituminous output at the end of the year will total about 400,000,000 tons. The last time production fell below that figure was in 1939.

Consumption — Through August, 1954, domestic consumption by the eight major consumer groups totaled a little over 237,000,000 tons, about 43,000,000 tons less than in 1953.

The only consumer group to show a gain in the first 8 mo, 1954 over 1953, was the electric-utility industry, which increased its coal burn a little more than 1,000,000 tons. Cement mills held about even.

Elsewhere, the losses were substantial. By-product and beehive coke ovens together dropped about 20,000,000 tons; steel and rolling mills, a little over 1,000,000 tons; railroads, 7,500,000 tons; "Other Industrials," 10,000,000 tons; and retail-dealer deliveries, 4,500,000 tons.

Stockpiles—Industrial stockpiles of bituminous, totaling 67,666,000 tons at the end of August, were at their lowest point since October, 1950. But in terms of days' supply at current rates of use, there was little to cheer coal producers.

On the whole, industrial stocks of bituminous dropped about 8,700,000 tons from August, 1953, to August, 1954, but days' supply at current use rates increased from 80 to 89 days. Group by group, here was the situation:

Coke ovens, 3,000,000 tons less but supplies up 5 days to 56.

Railroads, 1,000,000 tons less, supplies up 2 days to 37.

Steel and rolling mills, 300,000 tons less, supplies down 4 days to 63.

"Other Industrials," 5,000,000 tons off, but down only 1 day to 78.

Retail dealers, 700,000 tons less,

down 2 days to 10 days' supply.

Only cheerful spot in the days'-supply picture was the electric utilities. From August, 1953, to August, 1954, they increased their coal inventory by 1,000,000 tons while their days' supply stretched from 128 to 129.

Mine Closings—From Jan. 1, 1954, to September, *Keystone Coal Buyers' Manual* reports the temporary or permanent closing of 126 deep and strip mines with total daily capacity of 175,000 tons. Significantly, however, the figures show that whenever a company with two or more mines curtailed operations, it was the inefficient mine that was shut down.

No Monopoly on Trouble

IF COAL IS PLAGUED by troubles, so are coal's big competitors, oil and gas. Look at some of the worries oil men have:

1. Though oil consumption increased about 6% per year from 1946 to 1953, it showed only a slight gain in the first half of 1954. Meanwhile, the industry has continued to build new capacity. The result: At mid-year, some 10 to 20% of its facilities were idle and there was a surplus of some products, especially gasoline, with annoying price weaknesses.

2. Like coal, oil, following a period of some 8 yr in which demand taxed capacity, now is trying to learn how to live with spare capacity.

3. With Iranian oil scheduled to reenter world markets soon, the industry must face up to intensified competition world wide.

4. Rapidly growing supplies of natural gas are sapping oil markets.

5. The cost of exploration and drilling is mounting fast.

6. Coal, like gas, is a strong competitor for oil's markets.

7. Coal's drive to throw a quota ceiling over imports of residual oil is making oil men uneasy, to say the least.

8. Atomic energy may displace some quantities of oil in the long future, as it may displace some coal and gas.

Though gas, today's "glamor" fuel, is growing mightily, producers and distributors are not without their worries. Here are a few:

1. The industry is under federal regulation and suffers all the frustrations that follow.

2. Extension of Federal Power Commission authority over field prices forbids a fair price reflecting the inherent value of natural gas.

3. A large part of the industry's output must be sold at "dump" prices to keep pipe-line traffic loads at an economic level.

4. Facilities for stockpiling or storing gas are limited.

5. The industry often is embarrassed by inability to meet peak demands in some areas.

6. Domestic gas is threatened by moves to import gas from Canada and Mexico.

7. Coal and oil still are strong competitors with gas.

Efficiency Cuts Use

THE MARCH OF PROGRESS sometimes hurts. By and large, though, the hurt is temporary and over the span of years everybody gains.

Today, with coal users squeezing more useful Btu's from every ton of coal, the industry is suffering some of the passing pains of progress.

Suppose, for instance, the electric utilities today were burning coal at the efficiency that prevailed a scant 7 yr ago, in 1947. Then, it took 1.31 lb of coal to produce a kilowatt-hour of electricity. Now, in 1954, the utilities, on average, are producing a kilowatt-hour with 1 lb of coal. To generate this year's steam-produced kilowatt-hours at the 1947 efficiency rate, the utilities would have to burn 150,000,000 tons of bituminous instead of the projected 114,000,000 tons.

Thus coal may be said to have lost 36,000,000 tons to progress since 1947. But that is not the full story. By boosting their coal-burning efficiency, the utilities have cancelled out a substantial part of the higher cost of coal. That way, they have been able to price electricity attractively for more people and more industries and thus push their power sales up. The result: The utilities' bituminous burn increased from 86,000,000 tons in 1947 to an estimated 114,000,000 tons this year—a real gain of 28,000,000 tons to be credited to progress.

Suppose, as *Electrical World* predicts, utility electric output grows from 440 billion kilowatt-hours in 1953 to something in the order of 600 billion in 1957. Suppose also that coal no more than holds its present share of the utility-fuel market. And suppose the utilities continue to improve their burning efficiency at the 1947-54 rate. If those suppositions hold up, the utilities will burn 136,000,000 tons of bituminous in 1957.

The utilities are not alone in improving the coal-burning rate. Steel mills year by year are producing more steel per ton of coke and the railroads, though now a shrinking market for coal, are steadily increasing their freight ton-miles per ton of coal. Elsewhere, among small and medium industrial and institutional steam and power plants, new burning equipment is generating more pounds of steam per unit of coal (*Coal Age*, October, 1953, p 72). In short, a sizable share of coal's so-called losses in recent years are chargeable to progress, not retrogression.

Upturn in the Making

HOW DO COAL PRODUCERS see the outlook, especially for this last quarter of 1954? Many expect an upturn.

At midsummer, *Keystone Coal Buyers' Manual* asked this question of each of the 42 companies that produced over 2,000,000 tons of bituminous in 1953: "How does the fourth quarter of 1954 look to you?"

Officials of 22 companies replied. Seventeen predicted a gratifying increase over the first three quarters, with production reaching as high as 9,000,000 to 9,500,000 tons per week. That would be in the order of 50% above output in the second quarter and would bring the year's total to somewhere between 395,000,000 and 404,000,000 tons. Their estimates of fourth-quarter production ranged from 10 to 40% above second-quarter tonnage.

One producer saw the last 3 mo this way:

"I hope our production as well as our sales tonnage will increase. I cannot tell you by what percentage. I can tell you, however, that it will be increasing because of re-opening some mines that have been closed since April or during other periods of the summer. Also we expect, by adding an extra day or two to the working days of those mines that stayed open throughout the summer, to achieve further increases."

Another's prediction ran along these lines:

"There seem to be noticeable indications of improvement in industrial activity in this area and if this condition is nationwide, I do not believe you are particularly over-estimating the production potential for the coal industry for the last quarter. Frankly, I would not revise this figure (ie., 9,500,000 tons per week) downward more than 250,000 tons."

The Bright Spots

IF THERE ARE DARK SPOTS in coal's picture today, there also are bright ones. A fast random spot check reveals, at a glance, 22 reasons for coal men to look ahead with brighter hopes and new confidence.

1. In the Philadelphia area, accord-

Table 1—How Gains and Losses Look in Utility-Fuel Competition in Seven FPC Regions Where Coal Is Competitive

First Six Months, 1953 and 1954; Thousand Tons, Coal Equivalent

	Coal			Oil			Gas		
	1953	1954	Per Cent Change	1953	1954	Per Cent Change	1953	1954	Per Cent Change
New England	1,549	1,693	+9.2	2,302	2,080	−9.6	3	62	+1,966
Middle Atlantic	13,830	13,091	−5.3	2,656	2,162	−18.6	958	1,065	+11.2
East North Central	24,023	23,650	−1.5	161	155	−4.0	1,374	1,367	−0.5
West North Central	3,705	3,843	+3.7	380	349	−8.2	2,872	3,031	+5.5
South Atlantic	8,326	8,324	..	2,189	2,012	−8.0	1,093	1,210	+10.7
East South Central	3,647	5,408	+48.3	4,391	5,065	+15.3	1,278	1,411	+10.4
Mountain	478	479	..	234	166	−29.1	1,126	1,382	+22.7

Source: Federal Power Commission.

ing to the Aug. 4 issue of *National Petroleum News*, oil companies in the June-July contract-signing period with big industrial fuel users lost 6,000,000 bbl of heavy fuel oil to coal and natural gas. This is a 10% drop in demand for residual oil in that area. With coal at currently low prices, Btu-parity price for residual at Philadelphia at the end of September was $1.90 per barrel. Residual actually was posted at $2.12 to $2.25. Much the same price condition prevailed in New York harbor at the end of September. There, with Btu-parity price at about $2 per barrel, posted prices ran at $2.25 to $2.28.

2. Gas prices are rising, and producers and distributors are pressing FPC to let prices rise still higher and faster.

3. Electric-power generation keeps growing. Early in September, for instance, power output totaled 9,227 million kw-hr in a single week, compared with 8,324 million in the corresponding week a year earlier. That gain ran counter to seasonal trends in past years. In fact, with air conditioning fast throwing new loads on electrical systems, the customary summer slump in electric-power use probably has disappeared for good.

4. Philadelphia Electric Co. plans the world's largest steam-turbine generator, 275,000-kw capacity, which at full load will burn 100 tph of pulverized coal.

5. The Interstate Commerce Commission in recent months has granted several freight-rate reductions on fine coal and a few on larger sizes.

6. Reflecting a minute change in government thinking that may well mark a coming trend, now that coal's advocates are pressing their case in Washington circles, an executive order in March directed federal agencies to abandon plans to substitute oil for coal in three public housing projects in the fast-growing Philadelphia area.

7. Walker Cisler, president, Detroit Edison Co., predicts that the electric utilities will burn 165,000,000 tons of coal in 1957.

8. Steel production, after running in the low and middle 60's for much of the year, pushed above 70% of theoretical capacity at the end of September. By mid-October the rate had reached over 74% and industry spokesmen predicted a rate above 75% before the end of the year. The rise was cheering, but not unexpected. With over-all industrial production having run some 9% below 1953 and with steel tonnage some 24% below 1953, it was obvious that replenishing of steel inventories could not be long delayed. Within a single recent week, for instance, Bethlehem Steel Co. added two open hearths and a blast furnace to current production and Youngstown Sheet & Tube Co. resumed operations at its Brier Hill works.

9. The Eastlake plant of Cleveland Electric Illuminating Co. recently placed a third 140,000-kw generator in service. Meanwhile, construction is under way on a 208,000-kw unit to be completed in 1955.

10. Bonneville Power Administration now predicts a power shortage of some 800,000 kw for the Pacific Northwest within the next 10 yr. In fact, BPA fears that by 1961 the utilities serving that region will be unable to meet all their first loads under minimum water conditions and that the growth of new electro-process industries may push power deficits far beyond present indications. In any event, whether sooner or later, steam plants must play an increasingly significant role in that area.

11. Niagara Mohawk Power Co. recently placed a fourth 100,000-kw generator on the line at its Albany, N. Y., station.

12. Paperboard production the second week in October was nearly 8,000 tons higher than in the second week in September.

13. Privately financed construction in August totaled $2.4 billion, or 10% ahead of August, 1953. Totals for the first 8 mo put 1954 about 5% ahead of the same period in 1953.

14. As of July 1, only 114 new diesel locomotives were on order, compared with 933 on Jan. 1, 1953. Dieselization—and thus further attrition of coal's railroad market—is approaching an end.

15. The chemical industry now is operating at high levels, and is expected to continue.

16. Cement, which uses well over 8,000,000 tons of coal per year, is expected to continue capacity operations.

17. Textiles, which until recently were running about 12% below 1953, are beginning to pick up.

18. Food output now is running some 3% above 1953.

19. Automobile manufacturers—and therefore steel consumption—will gain fast following introduction of new models before the end of the year.

20. Close to $2 billion will pass through the treasuries of bituminous producing companies in 1954 in payment for coal shipped from mines.

21. Export prospects brightened measurably when, in August, the Foreign Operations Administration announced plans to move 10,000,000 tons of coal to overseas destinations. That will nearly double the current rate of overseas exports.

22. Industrial stockpiles of bituminous at the end of July were at 66,286,000 tons, the lowest point since October, 1950. In August, coal users began to rebuild their stocks and coal in storage at the end of the month totaled 67,666,000 tons.

These 22 market-outlook facts are

solid realities. They augur well for the remainder of 1954, for 1955 and for the years ahead.

Utilities Brightest

THE ELECTRIC UTILITIES in the first 6 mo of 1954 burned 54,934,000 tons of bituminous, against 53,839,000 tons in the first half of 1953. At that rate, the utility burn will total 114,000,000 tons in 1954.

What is the picture region by region?

Table I, drawn from FPC reports for the first half-year and including some 3,000,000 tons of anthracite, shows that coal either made substantial gains or held its own in all regions where it is competitive, with the exception of the Middle Atlantic and East North Central regions, where losses totaled about 1,500,000 tons. Gains in the other five competitive regions more than offset these losses. As for oil, it lost ground everywhere except in the East South Central region. Net oil losses were about 1,000,000 tons of coal equivalent. Gas, which appears to be the big gainer percentagewise, actually picked up only 800,000 additional tons of coal equivalent, bringing its 6-mo total burn in the seven competitive regions to only 9,500,000 tons of coal equivalent. Fact is, gas even lost a little tonnage in the East North Central region.

That's the picture according to FPC's regional boundaries. It shows that coal is doing all right with the utilities.

Now shift the boundaries slightly, as *Keystone Coal Buyers' Manual* does, to throw a somewhat different light on the market situation and outlook. The map at the start of this article shows six areas. In each of those areas, the utility-fuel situation and outlook is different. Here is the picture:

Area 1—Biggest Coal Customer: New York and Pennsylvania, exclusive of tidewater; Ohio, Indiana, Michigan, Illinois and Wisconsin. Utilities in this area burned 65,800,000 tons of bituminous in 1953. Competition amounted to 44,000 tons of coal-equivalent oil and 4,766,000 tons of coal-equivalent gas. Oil use is trending downward. The big gas burn is in and near Chicago, where growing storage facilities are making less gas available for interruptible service to steam stations. Coal, now the favored fuel, provides some 93% of the utilities' fuel in this area. Fuel-burning capacity is expetced to increase by 21,000,000 tons by 1958. Coal has an odds-on chance of capturing an increasing share of this growing market.

Area 2—Friendliest Coal Customer: Delaware, Maryland, District of Columbia, West Virginia, North Carolina and Virginia, exclusive of one tidewater plant in Virginia. In this area, electric utilities burned 16,700,000 tons of bituminous in 1953. It is coal's friendliest territory because steam-electric stations are 99.5% on coal. Utilities expect to expand their fuel-burning capacity to 22,300,000 tons by 1958. Coal should hold its present share of this market.

Area 3—Fastest-Growing Coal Customer: Alabama, Kentucky and Tennessee. Here, the Tennessee Valley Authority and the Atomic Energy Commission are responsible for a mushrooming growth in power generation. In 1953, electric generation consumed 7,600,000 tons of bituminous, 1,000 tons of coal-equivalent oil and 1,294,000 tons of coal-equivalent gas. In other words, over 85% of the fuel was coal. Coal should at least hold its present position and may, indeed, improve its percentage over the next 4 yr, during which period utility coal-burning capacity in this area is expected to increase well over 25,000,000 tons per year.

Area 4—Most Challenging Coal Customer: Tidewater Atlantic Seaboard, including New England, New York City and Long Island, New Jersey, Philadelphia, South Carolina, Georgia, and Florida. Utilities in this area burned 15,200,000 tons of bituminous in 1953, about 1,800,000 tons under 1952. Coal now commands about 55% of the utility-fuel market. Competition from imported residual fuel oil is strong everywhere and the use of gas is growing, especially in Georgia. Unless coal launches a vigorous assault to reverse today's market trends, further encroachment by oil and gas in this potential 25,000,000-ton market may be expected.

Area 5—Friends of Gas and Oil: Mississippi, Louisiana, Arkansas, Oklahoma, Texas, New Mexico, Arizona, Nevada, Idaho, California, Oregon and Washington. Coal's potential market here, like its present market, is negligible though, as pointed out earlier, long-term future developments in the Pacific Northwest may give coal a toehold. In this area, the only significant coal burn was by an Oklahoma utility, which used 129,000 tons in 1953. A big lignite-burning station, soon to go on the line in Texas, will not change the picture significantly. With coal very nearly out of today's picture, the struggle is between oil and gas. Gas now is invading oil's markets.

Area 6—Promising Market for Coal: Minnesota, Iowa, Missouri, North and South Dakota, Nebraska, Kansas, Montana, Wyoming, Colorado and Utah. In this area, coal now holds less than 50% of the utility-fuel market, with consumption of about 7,500,000 tons in 1953. An additional 5,000,000 tons of burning capacity will be installed by 1958. Present trends are uncertain but future power development in some parts of the area, especially in western Colorado, doubtless will look to coal as the major source of energy.

Strength for Growth

ALL THE EVIDENCE adds up to two conclusions: (1) coal has passed its low point; (2) barring a major depression affecting all industry, coal's movement from now on will be upward in most of the Nation.

If present indications stand up, 1955 may be as much as 10% ahead of 1954 and each succeeding year thereafter will bring continuing growth. That will mean more working time for fully equipped, modern mines; more investment in new mines, plants and equipment; and a stronger industry better prepared to carry any load the Nation's need may impose.

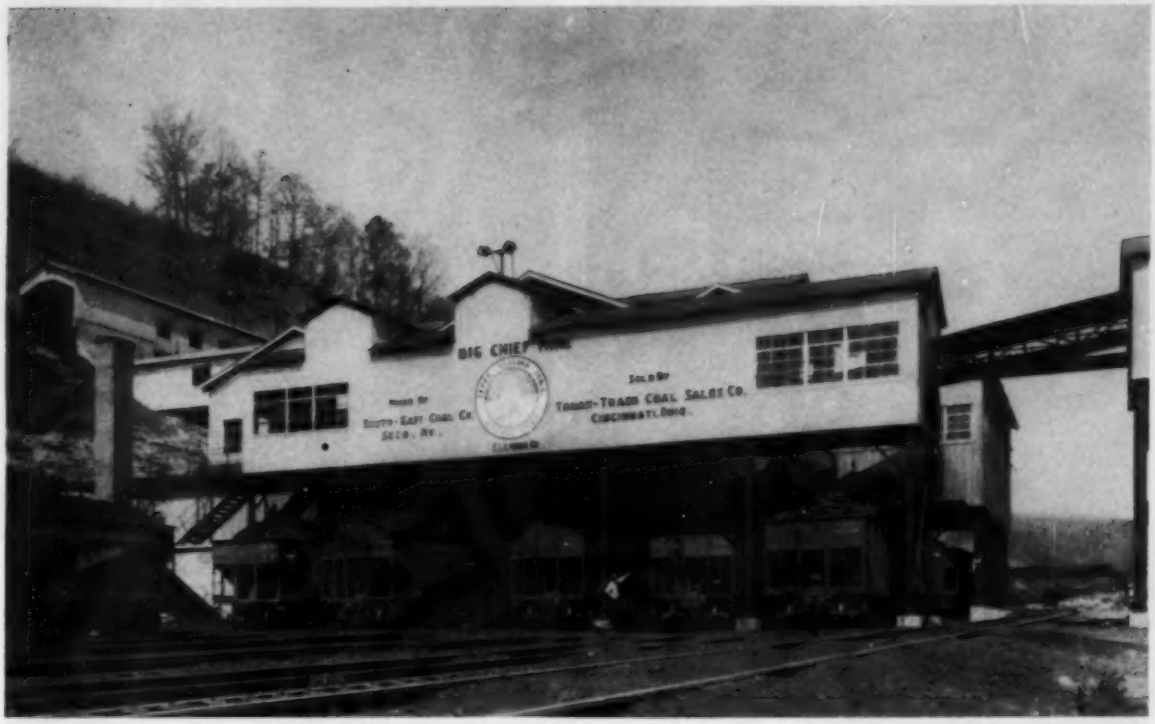
But there is no magic that will convert coal's opportunities automatically into reality. The industry must help itself toward better days.

Today, in spite of troubles, coal has a strong position from which to make its start toward a better tomorrow. The shakeout of the past 2 yr has left the industry with a strong base of efficient mines and well-run, enterprising companies. Coal now is massing its power on those fronts where concentrated action offers the most rewarding benefits, that is, in merchandising and sales, and in rebuilding coal's stature in government policy-making circles. Coal's workers, thinned down in numbers but strong in skill and loyalty, can be counted on to do their share to push coal forward. Finally, the industry's engineers and its equipment manufacturers have caught a vision of the potential for higher productivity and today are designing and experimenting with new machines and equipment of eye-opening possibilities.

In all these efforts, and along other lines as well, the industry can afford no let-up. Those who diligently seek tomorrow's opportunities will win their rewards.

HIGH-TONNAGE LOADING **ADOPTION** of mobile loading machines and shuttle cars with 4-wheel drive and steer as part of Big Chief modernization plan increased section efficiency 50% and is major factor in over-all mine output of 14 tons per man-shift, all employees on payroll.

SOUTH-EAST COAL CO. OPERATIONS—Millstone property (left) opened in 1915, recently exhausted Seco No. 1, and the newly leased property being operated as Big Chief mine (right).



TOP-QUALITY PREPARATION **COMPANY DESIGNED** and built 300-tph preparation plant at Big Chief mine is equipped with a jig washer and was planned primarily for preparing a top-quality domestic coal. Man trestle over railroad tracks to bathhouse appears in distant background (right).

Quality With Efficiency

Underground methods yielding 14 tpm in 42- to 56-in coal are matched with modern preparation characterized by vibratory screening and conveying, jig washing, crushing and rescreening, cold-oil dustproofing, "fire-eye" protection and vacuum dust collection.

By J. H. EDWARDS, Associate Editor, COAL AGE

RECENT INSTALLATION of Super 14-BU loaders and shuttle cars, which boosted section efficiency 50%, has virtually completed the modernization program under way at the Big Chief mine of the South-East Coal Co., Seco, Letcher County, Ky. First steps in the program included a new haulage portal and a 300-tph preparation plant, designed and built by coal-company men, which went into operation in November, 1952.

Rail haulage now is "continuous" from underground loading points to the tipple dump at Big Chief, with trips turned by loops both underground and on the surface. The new preparation plant was planned by the coal company to include such features as an extra large sludge tank that doubles as water storage for fire protection, the use of vibrating-type screens exclusively, installation of a board-hung vibrating decline conveyor, a dust-allaying system, vacuum-cleaning system, a new-type flame detection system and a generous installation of loud-speaking telephones.

The South-East Coal Co., headed by Harry LaViers, of Paintsville, Ky., president, was organized in 1914 and started operations that year at its No. 1 mine at Seco. In 1915, it opened a property at Millstone, now LaViers No. 2 mine, some 2½ mi from Seco. The plants are served by the L&N Ry. The seam mined is the Elkhorn No. 3, yielding a low-ash, low-fusion, slightly-coking coal especially suited to the domestic market.

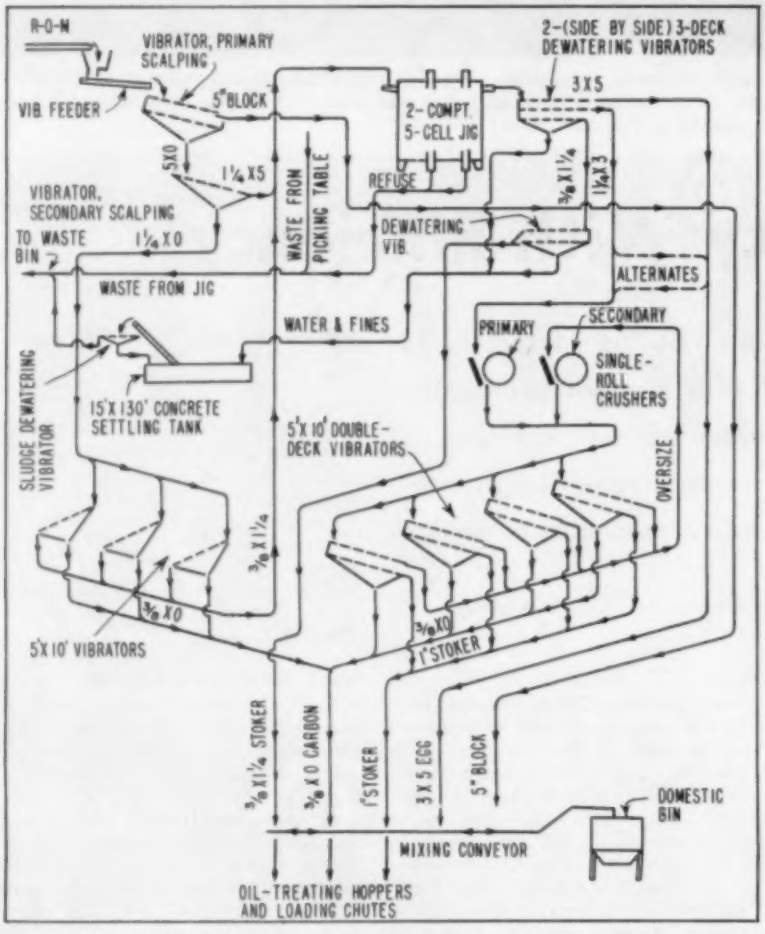
NEW TERRITORY LEASED

In 1947, when the territory at Seco was approaching exhaustion, 1,400 acres adjoining Seco No. 1 and bordering on Boone Fork of the Kentucky River were leased. While this additional coal could have been mined through Seco No. 1, the long haul, together with a need to improve preparation, pointed to the desirability of building an entirely new plant closer to the bulk of the coal.

A 20-yr life was projected for the

PRIMARY SCALPER, like all plant screens, is a vibrator. A vibrating decline conveyor (foreground) moves the 5-in block to a lump boom belt where it is handpicked.

JIG WASHER cleaning the 5x⅜ fraction of the mine output is a 2-compartment 5-cell unit capable of handling 350 tph and now operating at about 200 tph.



FLOW SHEET of the Big Chief plant designed and built by coal company.

property, based on the premise that mining would be planned so that full tonnage could be maintained to within a few months of total exhaustion.

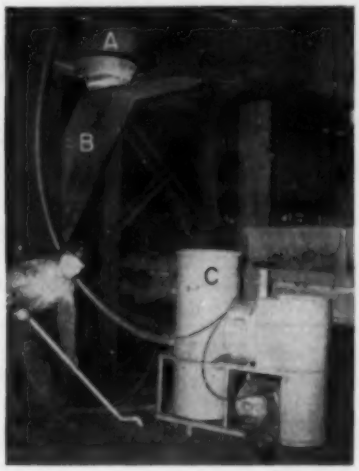
PLANT DESIGNED BY COMPANY

W. R. Preston, purchasing agent and maintenance superintendent, who had gained considerable experience in rebuilding and modernizing the company's plants over the years, designed the Big Chief plant. Mr. LaViers and Virgil L. Picklesimer, vice president—operations, consulted with him as the plans shaped up. The company's goal was a plant designed primarily for doing a top job of domestic preparation—a clean and compact plant but still with sufficient room to accommodate changes that may prove desirable in the future and, particularly, a plant with low maintenance requirements. The coal is easy to wash, with a reject consisting principally of a high-gravity slate that now runs about 4% of the raw feed.

Steel still was in short supply when the plant was being designed and for that and several other reasons the main part is a wood structure. The company owned its own standing timber and a saw mill from which beams as large as 12x24 in by 18 ft and 12x12 in by 36 ft were sawed for the job. Company officials point out that wood has a high resistance to failure and that its shock-absorbing qualities perhaps will minimize equipment maintenance. They believe that changes are easier to make in a wooden structure and they felt that by using their own timber they could

AFTER BEING CRUSHED for stoker, washed 3x1¼ and/or 5x3 are screened on these four 5x10-ft double-deck vibrators. Oversize from top deck is crushed and recirculated.

CONTROL BOARD is located near jig. Loud-speaking phone system with 17 stations spotted about plant facilitates control, maintenance and supervision.



DUST CONTROL includes equipment (left) feeding chemically wetted water to sprays at car dump, R-O-M belt discharge and two crushers. Dust gathered by vacuum cleaner (right) is piped to various stations. Coarse dust in Tank A can be discharged to carbon conveyor through Chute B. Very fine dust is periodically emptied by hand from bag in Tank C.

be fairly liberal in the design and thus better provide for future changes. Floors are 2-in tongue-and-grooved lumber which the company's mill also sawed.

An exception to wood framing was made in designing the section of the plant where oil spraying is done. For purposes of fire prevention this section is a steel structure with steel floors. Roof and sides of the plant, headhouse and R-O-M conveyor gallery are covered with 0.031-in corrugated aluminum.

The entire plant is being equipped with a Fireye system of flame detection. Scheduled for completion early last month, the installation marks the first use by the coal industry of a comparatively new fire-protection system manufactured by the Fireye Div., The Electronics Corp. of America, Boston, Mass., and distributed by the Firewake Corp., Ashland, Ky. The system is electronic and operates on "electric eye" principles. It is responsive to the modulated radiation characteristic of flames and provides a positive indication of the continuous protection. The Big Chief installation consists of 30 "eyes" scattered throughout the plant, tied into two separate circuits. Alarm from either of the two circuits will activate sirens inside and outside the building and flash a warning light in the local fire station.

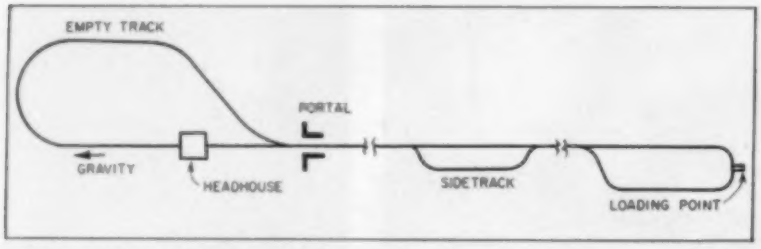
COAL WASHED IN JIG

All 11 screens in the plant are Simplicity vibrators. The vibrating feeders to the R-O-M belt and to the scalping screen are of the same make. A chute moving 5-in block from the scalping screen to a belt boom is a Simplicity "Oscavayer," a vibrator hung on boards.

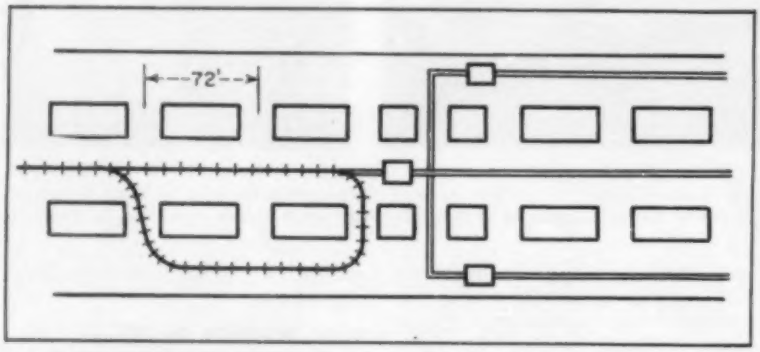
Mine cars of the lift endgate type, controlled by a Nolan car bumper stop, dump to a 15-ton hopper. From it, the raw coal is conveyed on a 48-in by 160-ft (c-c) level belt to a 10-ton surge

IN THE FIVE WORKING SECTIONS at Big Chief, coal is undercut with shortwalls and shot with permissible powder.

BAD ROOF is held by bolted crossbars. Roof-bolting is practiced in entry headings and about half the rooms.



"CONTINUOUS HAULAGE" is obtained at Big Chief with loops at the loading points and headhouse. Trips of 20 to 40 cars have a locomotive at each end.



IN DEVELOPMENT SECTION using shaker-loaders, the loading point advance is 280 ft. Headings are driven 13 ft wide on 36-ft centers.

hopper at the top of the plant. The double-deck 4x15-ft primary scalper has 3-in round perforated plate on the top deck and 2½-in mesh on the bottom. The 5-in lump, moved by the Oscavayer, is deposited on a level section of the lump boom belt where it is handpicked.

From a 5x4-ft vibrating secondary scalper, the 1¼x0 separated from the 5x0 feed goes to three 5x10-ft vibrators equipped with trays and bouncing rubber balls to keep the screens clean. The ⅜x0 moves to the carbon loading track, and the 1¼x⅜ joins the 5x⅜ fed to a Jeffrey 2-compartment 5-cell Baum jig. The washing unit, capable of handling 350 tph, now operates at a feed rate of approximately 200 tph.

The two 4x12-ft primary vibrators have three decks. The top is 3-in round plate, the middle section a 1¼-in screen wire and the bottom is covered with 1-mm stainless cloth.

Water and fines go to a concrete sludge tank 15 ft wide and 150 ft long, equipped with a Jeffrey conveyor and drive. Product from the tank is dewatered on a 3x8-ft screen with 1-mm stainless deck. A centrifugal pump stands ready to pump water from this sludge tank into water lines for fighting fire.

The only loss of coal from the plant is minus 1-mm breakage in the jig, which runs less than 10 tons a day with a 2,500-ton daily output.

Washed 3x1¼ coal is crushed in a Jeffrey Series R 30x45-in single-roll primary crusher and the product moves to four 5x10-ft double-deck stoker vibrators. Oversize from the top deck is crushed in a secondary Series N crusher of the same size and make.

The ⅜x0 washed fines from the stoker screens, mixed with the unwashed ⅜x0, makes a carbon that runs less than 6% ash.

Brown-Fayro cold-oil 400-psi oil-treating equipment handles the dustless treatment of coal. Valves and meters are positioned in the glass-enclosed control center booth, which provides an unobstructed view of the loading points on all five tracks, two of which have loading booms (belt-type). From the control-center booth, one man controls all loading, oil treating and operation of diversion chutes to change

SUPERINTENDENT of Big Chief mine, B. F. Gish, watches coal roll out.

cars without stopping. Five Brownie layer-loading hoists handle the cars.

DUST COLLECTOR INSTALLED

Also scheduled for installation last month was a dust-collection system utilizing a Type N Arrangement D Rotoclone made by the American Air Filter Co., Louisville, Ky. A wet-type cyclone collector, the Rotoclone is to be placed directly over the washer sludge tank and will use as the trapping medium water continuously circulated from the clarified portion of the sludge tank. The company estimates that the Rotoclone installation will add about 2 tons a day of 100-mesh and finer dust to the water of the sludge tank and expects that no changes in the sludge tank will be necessary to handle the additional load.

The Rotoclone will be connected via duct work to collecting hoods placed at seven strategic points throughout the plant and is expected to exhaust 24,000 cfm of air. The seven collection points are: discharge end of the 48-in R-O-M conveyor; feeder and first 3 ft of primary scalper; first 3 ft of secondary scalper; conveyor discharge into washer feed conveyor; discharge points of the three carbon (⅜x0) vibrators; primary crusher; and recirculating crusher.

Femco loud-speaking phones throughout the plant facilitate control, supervision and maintenance. There are 17 stations, including one in the headhouse. Washer and plant controls other than those mentioned are located on the washer floor within reach of the jig operator.

Dust is cleaned from plant floors, ledges and machinery with a 3-hp vacuum cleaner made by the Vacuum Cleaner Corp., Dover, Ohio. Stationary piping to the attachment stations is plastic.

Electric motors (440-v) are all General Electric totally-enclosed fan-cooled ball-bearing units. Most are Type KG high-torque motors. Starters also are General Electric.

Refuse is conveyed on a 30-in by 200-ft (c-c) belt to a truck-loading hopper. The haul of 3 mi to the disposal area is handled by one International L-194 end-dump truck.

Other outside facilities at Big Chief include a shop and supply house in a concrete-block building measuring 50x 175 ft, of which the shop takes 100 ft and the supply room 75 ft. The 30x60-ft bathhouse, also of concrete blocks, has radiant floor heating which the men like very much. A bridge from the hillside across the empty tracks of the railroad to the bathhouse is a convenience and safety feature appreciated by the men. A modest concrete-block building closer to the portal houses the mine office and lamphouse.

MINE SWITCH SMOOTH

Switching production from the old Seco No. 1 mine to the Big Chief plant was accomplished without delay. On the third day, production was up to normal. No bugs of consequence showed up in the plant, and satisfactory adjustment of the jig was accomplished in a few hours.

Average thickness of the Elkhorn No. 3 seam in the territory now supplying Big Chief is 48 in, with a range of 42 to 56 in. The seam is devoid of any continuous parting and the bottom is a firm slate. The top, generally consisting of a firm gray slate 30 ft thick, makes a good roof except where fractured. Above the slate is a massive sandstone. Grades in the seam reach 5%.

TWO TYPES OF SECTIONS

Of the five sections worked, four are mining room-and-pillar with Joy 14-BU loaders and shuttle cars, while one section devoted to heading development is worked with duckbills, the method used for the entire production of Seco No. 1 mine.

Of the seven Joy loaders at the mine, six in use, two are Super 14-BU and others the regular 14-BU units. Shuttle cars are Type 6-SC cable-reel machines, 32 in high with 4-wheel drive and steer, and are loaded to approximately 3½ tons.

Cutting is done with Goodman 512 shortwalls equipped with bugdusters and transported on Joy T2 trucks. In the duckbill section, Goodman chains and Goodman throwaway bits are used on the machines. Other shortwalls use Bowdil chains and Bowdil throwaway bits. In the development section, No. 5 pans are used on the center conveyor outby the transfer point. All others are No. 1½ pans.

Drilling is handled with Chicago Pneumatic 572 high-speed hand-held electric drills using Kennametal bits. King Red Crown permissible powder shoots the coal.

Roof-bolting is carried on in entry headings and in the rooms whose top requires support. About half the rooms fall in this category. Equipment consists of four Chicago Pneumatic RBD-30 rotary drills. Dust is collected dry in gravity-type collectors made in the mine shop. Roof bolts are ¾-in expansion-shell type, 42 and 48 in long.

With the Joy loaders, rooms 18 ft wide on 35-ft centers are driven 300 ft deep. Pillars are pocketed, which permits a much better recovery than was realized with conveyor mining when pocketing was not done.

Shuttle cars discharge to an elevator at the loading point, which is on a loop track, and mine cars are spotted by a Brownie hoist. Because of the grades, two gathering locomotives, one on each end, are used on the trips of 20 to 40 cars set in the loop. Use of a hoist rope long enough to load 25 cars saves time at the loading point. Cars are turned at the preparation plant by coasting from the dump around an empty loop.

SECTION EFFICIENCY HIGH

A Joy Super 14-BU crew consisting of 12 men, including the foreman and repairman, has averaged 300 tons per shift over a month and has hit top productions of 400 tons, cleaned-coal basis. Over-all production per man on the payroll at Big Chief is 14 tons, including the superintendent, the preparation-plant crew, shop crew and men taking care of the lamphouse and bathhouse.

A normal full crew for the entry-driving duckbill is 10 men when roof bolting is required. Production on this type of section averages 19 tons per man-shift. One of the reasons for continuing to operate a development section with duckbills is the fact that, in contrast to Joy sections, a short crew can be used without reducing the tons per man-shift. With absenteeism on a Joy section, a man or two can thus be borrowed from the duckbill section without lowering the man-shift production.

Harry LaViers Jr. is assistant to the president of the company; C. C. Hooper is chief engineer; and Logan Music is shipping and preparation manager. Ben Gish is mine superintendent at Big Chief.

STRIPPING SHOVEL is key to pit efficiency. Light 'dozer piles loose overburden, making 33-yd shovel economical in thin cover.

DRILLING and shooting is done above bottom seam only but heavy shots break rock above upper seam.

PINNING MACHINES, each equipped with a 4,000-lb weight and pin, break thin coal for loading.

Pittsburg & Midway Pit Units Spell High Efficiency

HORIZONTAL-THRUST loading shovel is especially adapted for high-speed work in thin coal seams.

SPECIAL DIPPER on one loading shovel is shallow at butt, thus prevents "heeling" in thin seam.

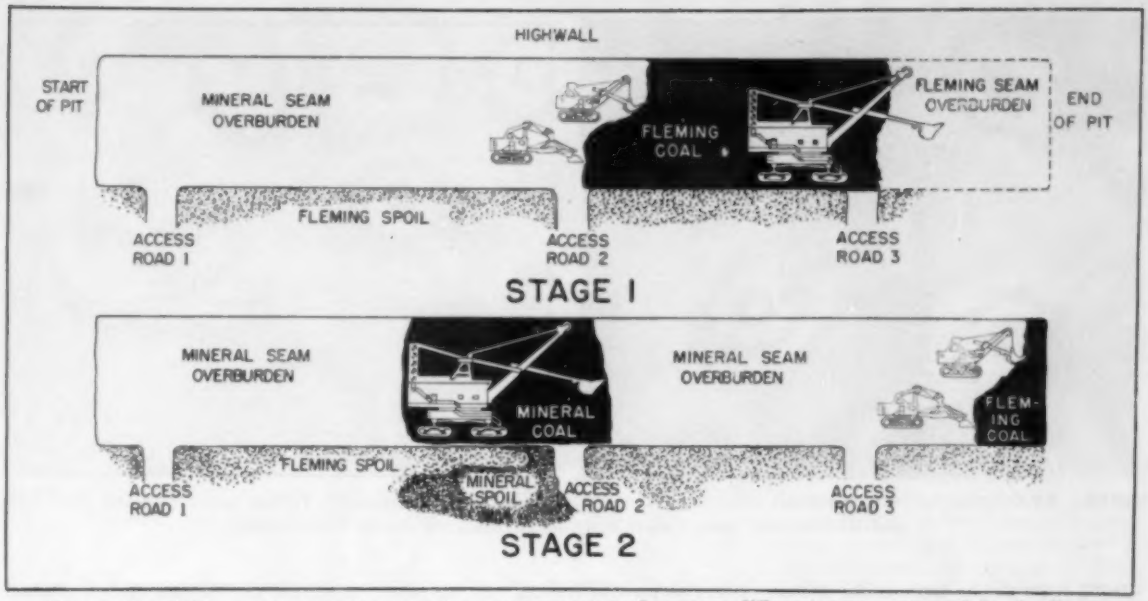


FIG. 1—Flexibility in pit operations enables management to keep two different seams exposed for loading.

Pittsburg & Midway Strips Two Seams at Once

Planning at Mine No. 19 solves three problems:

1. **How to handle high stripping ratio efficiently.**
2. **How to keep two different seams uncovered.**
3. **How to adapt machines and methods to thin seams.**

SIMULTANEOUS STRIP-MINING of two inherently different coal seams, a digging ratio that sometimes runs as high as 40 to 1, painstaking care in removal of overburden and a high degree of flexibility and efficiency in the pit mark operations at Mine No. 19, Pittsburg & Midway Coal Mining Co., Pittsburg, Kan.

The two inherently different coal seams widen the span of Pittsburg & Midway's markets.

The thinness of the seams requires extreme care in digging overburden. For instance, if the teeth of the big bucket should mistakenly pick up 2 in of coal from either seam, loss of coal would run to 11% or so.

And modern mining equipment, sound methods and 75 loyal employees combine in flexibility and efficiency to produce 2,700 tpd at normal output rate; 3,100 tpd or more when pressure mounts. For every day's production of 3,100 tons or more, the company picks up the tab for a steak dinner, barbecue or fish fry for all employees.

Mine No. 19 is located some 35 mi southwest of Pittsburg and is served by the Missouri, Kansas & Texas R.R. Coal in the tract now being mined is adequate for 15 yr. Stripping proceeds at the rate of a little over 200 acres per year.

Strata in the present pit run approximately as follows:

Clay and topsoil—23 to 25 ft.

Blue shale, some of it quite hard—10 ft.

Fleming coal seam—17 in.

Fireclay, shale and slate—13 ft.

Mineral coal seam—18 in.

The upper coal seam, the Fleming, is a low-ash, low-moisture, high-Btu coal. The seam rolls occasionally, sometimes severely, and from time to time disappears entirely in faults. Fleming coal is a first-rate domestic fuel.

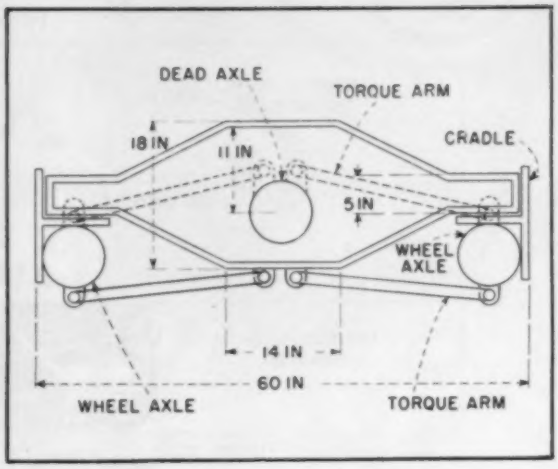
The Mineral seam, which lies flat as a table, is a high-quality steam coal.

OVERBURDEN—KEY TO PROFIT

"You can drive into a pit, watch the big shovel at work and tell by that whether the mine is making money. If overburden slows the shovel down, you're losing money. If the shovel can work fast, you're making money. It's as simple as that."

So says Edwin R. Phelps, Pittsburg & Midway's vice president—operations. Accordingly, he aims to make everything easy for the Bucyrus-Erie 950-B electric shovel with its 33-yd dipper.

For mining the two seams, the company has developed an unusual method of drilling and shooting. The really hard digging above the top seam is a cap rock that lies directly above the coal. To break this cap rock without drilling into it or above it, pit crews drill holes over the bottom seam only, load the holes somewhat heavier than for ordinary shooting and then blast away. The shot is



STEEL BOX replacing trailer springs eliminates spring breakage and replacement. Torque arms between dead axle and wheel axles keep trailer body level. Diagram shows construction.

strong enough to loosen the softer overburden above upper and lower seams and to crack the cap rock above the upper seam. Early fears that such heavy shooting would practically pulverize the top seam and make it difficult if not impossible to load it out of the pit proved unfounded. The secret lies in close control of the quantity of powder used. The result is the satisfactory fragmentation of two layers of overburden at the cost of only one set of drillholes.

Drilling is done by McCarthy Coalmaster horizontal drills equipped with McCarthy augers and carbide-tipped bits and powered by water-cooled QXC-5 Hercules gasoline engines. Drillholes 5½ in in diameter are driven 80 ft deep into the highwall on 27-ft centers about 24 in above the Mineral seam. Normal drilling speed is about 3 fpm but occasional limestone "floaters" in the shale sometimes make drilling hard and slow.

UNCOVERING THE TWO SEAMS

Pit width at Mine No. 19 runs 80 to 90 ft. The stripping shovel, with its 70-ft stick and 110-ft boom, always works on top of the coal, upper or lower seam as the case may be. The shovel dumps overburden lying above the Fleming seam (upper) into the pit left by removal of the Mineral seam in the previous cut. Overburden from the Mineral seam contains wet fireclay and therefore is thrown over and beyond the Fleming-seam spoil to avoid slides.

On the first pass in a new pit, uncovering the Fleming seam, the shovel usually works the full length of the pit, while loading equipment finishes removal of the Mineral seam from the previous pit and follows into the new pit to begin mining the Fleming seam. At the end of its first pass through the pit, having cleared off the Fleming seam, the stripping shovel deadheads back to the rear of the loading units, which by this time have mined a substantial part of the newly-opened Fleming seam. Working behind the loading equipment, the big shovel now strips overburden from above the Mineral seam, advancing either toward the start of the pit or toward the loading units, as dictated by circumstance and need.

Circumstance and need are controlled by two factors: (1) the demand of the preparation plant for either Fleming or Mineral coal which, as pointed out earlier, are inherently different coals; and (2) efficient layout of pit-access roads.

Operations naturally are set up to keep both seams open for mining whenever possible. Even so, men in the pit argue, with wry good humor, that the sales department and the plant always want Fleming coal when Mineral coal is being loaded and Mineral coal when Fleming coal is readily available. Doubtless, sales and plant officials see the other side of the coin.

But these complaints are the good-natured grumblings of contented men, because stripping and loading operations actually are flexible.

Suppose, for instance, as illustrated in the accompanying pit diagram, the stripping shovel has removed overburden from the Fleming seam to the end of the pit and that the loading shovels are loading Fleming coal close behind the stripper. Suppose also that it is desired to have Access Road No. 2 open for hauling Mineral coal as soon as Fleming coal is mined out to the end of the pit. Under these circumstances, the stripping shovel deadheads back, passing the loading units in the pit, to a point close to Access Road No. 2 and between Access Roads Nos. 1 and 2. The stripper turns around; digs its way down to the Mineral seam, making an in-the-pit box cut; and then advances toward the loading equipment, which still is mining Fleming coal. Thus, at one time, both seams are exposed at a point close to the loading equipment and Access Road No. 2 is quickly available for hauling Mineral coal out of the pit.

Under different circumstances, the stripper on its second pass can begin near the middle of the pit and advance toward the start of the pit, or it can deadhead all the way to the start of the pit, near Access Road No. 1, and advance without interruption to the end of the pit, near Access Road No. 3.

A Caterpillar D-2 with a 'dozer blade does yeoman service around the big stripper, piling up shale and dirt for the shovel dipper. Except for the help provided by this piece of light equipment, it would be uneconomical to use the 33-yd shovel for stripping the 13 to 14 ft of overburden lying above the Mineral seam.

In an auxiliary pit some 2 to 3 mi distant from the main pit, a Bucyrus-Monighan diesel-electric walking dragline with a 12-yd bucket strips overburden from the Fleming seam, which is the only coal mined in the auxiliary pit.

LOADING AND HAULING COAL

Two loading shovels work in the pit at Mine No. 19, adding to the flexibility needed for mining two seams

PRIDE OF THE FLEET outpulls other trucks, say Emil Sandeen (left), superintendent, and F. J. Foresman, director, industrial relations.

at once. There are times, for instance, when one loader mines Fleming coal; the other, Mineral coal.

The Bucyrus-Erie 38-B loader is powered by a Caterpillar D-13000 diesel engine. The 3-yd dipper, shallower at the butt than at the mouth so as to work in thin coal without "heeling," was designed and built at the Pittsburg & Midway shop. Height at the butt is 30 in; at the mouth, 36 in. Width is 5 ft. Depth from lip to butt is 54 in; depth along the top, 37 in.

The other loading shovel is a Bucyrus-Erie 85-B, electric-powered, with a horizontal-thrust boom and a 6-yd dipper. Horizontal thrust is especially suitable for loading the thin seams at Mine No. 19.

Both seams, Fleming and Mineral, are not only thin but also hard, and they must be broken if the loading shovels are to work efficiently. Shooting the coal is not the answer.

The real answer to the problem of breaking the thin coal is a pinning machine. Pittsburg & Midway has two of them at Mine No. 19. A pinning machine is a piledriver rig, with a 2-ton weight, mounted on a Caterpillar D-7 tractor. A 9- to 12-in pin is attached to the bottom of the weight to penetrate the coal. The weight is lifted on an endless chain to a height of 12 to 15 ft and then dropped on the coal. The pin, thus wedged into the coal, is freed when the weight itself hits and fractures the coal. The extent of the breakage can be controlled by spacing the distance between successive blows by the weight-and-pin.

All eight haulage trucks are Darts, pulling 40-ton dropbottom trailers built by United Iron Works. Four of the trucks are powered by General Motors 671 diesel engines and three by 250-hp Cummins NHB diesels. Pride of the 8-unit fleet is a Dart powered by a 275 Cummins with Allison torque converter and Torqmatic transmission, which outpulls everything else in the fleet and, with minimum shock on working components, practically eliminates wear, strain and therefore maintenance.

BOX REPLACES SPRINGS

An experimental change in one of the trailers has worked so well that other trailers soon may be changed similarly. The change eliminates the rear springs, which often break in rough pit service and are hard to repair and replace, and substitutes for them a heavy, hollow steel box designed, built and installed by Ralph Sanders, garage foreman, under supervision of Emil Sandeen, superintendent at Mine No. 19.

The box is built of 1-in steel plates and heavy steel bars, with a cross-section thickness of 6 in, a height ranging from 5 in at the ends to 18 in at the midpoint, and a length of 60 in. When installed, the length runs parallel to the length of the trailer. This box, shown in diagram and in one of the accompanying photographs, rests at midpoint on a 45-in dead axle. A slot 1 in wide and ⅜ in deep, cut into the dead axle near its end, accommodates a heavy washer which, when bolted into place, secures the box to the dead axle. Brass washers, ¼ x 1½ x 5⅛ in ID, encircle the dead axle and rest against each side of the box. A steel cap fits over the hub of the dead axle to seal out mud and dirt.

The ends of the box, narrowed down to 5 in in height, rest in 7 x 9-in steel cradles on the forward and aft axles of the tandem rear wheels. The cradles, made of 1-in steel plate, take the wear and tear off the wheel axles. Upper and lower torque arms between wheel axle and box absorb the twisting effects of pit travel and keep the trailer bed level under all conditions. Mr. Sanders reports that the box has eliminated all troubles formerly encountered with sagging and breaking springs. Disassembly, when wear plates or torque bars need replacement, is simple.

The present haul from pit to preparation plant is about 1½ mi. Haulage-road grades are negligible, never over 2% against the load and often actually in favor of the load. Roads are built with a base of 16 in of good-sized rock from the rotary breaker at the plant, with a 12-in topping of power-plant cinders and sometimes with a little admixture of red gravel. Road width runs about 50 ft, with drainage into ditches along each side. A Galion road patrol, a sprinkler truck and a part-time bulldozer are used to maintain roads.

Pit-access roads are built with equal care, though not as wide as main haulage roads. Every effort is made to hold grades on pit-access roads to a 4% maximum, though grades as steep as 6% sometimes are unavoidable. Because the coal is thin, pit units haul out approximately 1¼ acres of coal each working day. This rapid movement up and down the pit requires a much greater extension of pit-access roads than ordinarily.

Until recently, pit drainage was no problem because of a 2-yr stretch of dry weather. Even now, with normal rainfall, drainage causes little worry because natural contours usually take care of water in the pit. Where drainage is not natural, ditches are opened with the stripping shovel or a bulldozer. For emergencies, the company keeps a dozen or more pumps on hand, ranging in size from 3 to 6 in, all gasoline driven, with Wisconsin engines for smaller units and Hercules or Red Seal engines for larger units. When pumping is necessary, water is thrown over the highwall in canvas hose, which is flexible and easy to handle.

Besides Mr. Phelps and Mr. Sandeen, operating personnel at Mine No. 19 include the following: Kenneth Moore, mine engineer; H. J. Garrison, electrical engineer; and N. Nifong, preparation superintendent. All stay in touch with each other, with seven pit and highway mobile units and with the city office in Pittsburg by means of a General Electric VHF radio communications system.

From Raw Coal To Precision Product

IN PITTSBURG & MIDWAY'S CLEANING PLANT at Mine No. 19, flexible blending circuits and painstaking care assure customers of the best coal for their special needs.

Top Quality, Low Cost at P & M

Keystones of Pittsburg & Midway's Cleaning Plant:

EQUIPMENT to keep quality and efficiency high

MAINTENANCE to keep the plant running well

FLEXIBILITY to clean coal from two seams

QUALITY CONTROL to meet customer's needs

By F. J. FORESMAN, Director, Industrial Relations
The Pittsburg & Midway Coal Mining Co., Pittsburg, Kan.

FLEXIBILITY, higher efficiency in operation and improved quality of product are features of the new coal preparation plant of The Pittsburg and Midway Coal Mining Co.'s Mine No. 19, located near Hallowell, Kan. Built to replace a plant that had been in operation for over 18 yr, it has been an important factor in boosting quality and efficiency and in the reduction of coal-preparation costs.

The plant was built by the McNally-Pittsburg Mfg. Corp., Pittsburg, Kan., and was designed in co-operation with the operating and engineering departments of The Pittsburg and Midway Coal Mining Co. Coal preparation experiences of both companies were utilized in working out the design after a careful study of all the problems involved from the standpoint of both production and sales. Special consideration was given such operations as crushing, sizing, sludge and refuse disposal and fine-coal recovery circuit.

Designed especially for flexibility in loading, the design is such that any size of coal within the screening limitations can be loaded at any time. The procedure is accomplished through the arrangement of the mixing conveyor and recrushing circuit, making it possible to crush, recirculate and rescreen all or any part of the production. This feature makes it possible to load according to orders, which not only provides better service to customers, but also boosts plant efficiency by eliminating the necessity of loading sizes not on order.

Capacity of the plant, 550 tph, was established by determining the maximum production possible in relation to the average stripping ratio and maximum yardage of excavation equipment. This was based on the plant operating one shift six days per week and the stripping equipment three shifts seven days per week. Five loading tracks serve the plant and, in addition, any size coal may be conveyed to three steel truck bins to meet the requirements of the custom coal trade. Maximum size of coal loaded is six inches. All shipments originate on the M.K.&T. R.R., which is the line that serves the mine.

FEEDING COAL TO THE PLANT

Coal from the 150 ton-receiving hopper is fed by a 60-in McNally-Pittsburg reciprocating feeder into a 36x60-in McNally-Pittsburg double-roll crusher set to break the coal to minus 16 in. The feeder motor is equipped with a Reeves vari-speed control, which permits the washer operator to adjust the feed tonnage by remote control. Discharge from the crusher is conveyed by a 48-in drag conveyor to the top of the rotary breaker house, where it passes over a stationary bar screen with 3-in openings. Coal passing over the screen is fed into a 10x20-ft McNally-Pittsburg rotary breaker, where it is broken to minus 6-in. The action of the rotary breaker results in positive uniform sizing and the elimination of rock and sulfur balls in the feed. This positive maximum top size and uniformity of size makes it possible to increase the tonnage and the efficiency of the washboxes. The rock and other impurities are discharged into a rock conveyor and to a rock bin. The coal passing through the bar screen and the coal discharge from the breaker are fed onto a 36-in R-O-M belt conveyor operating at 450 fpm, which conveys the coal to the top of the plant so that gravity flow can be utilized in the various sizing and refining processes inside the plant.

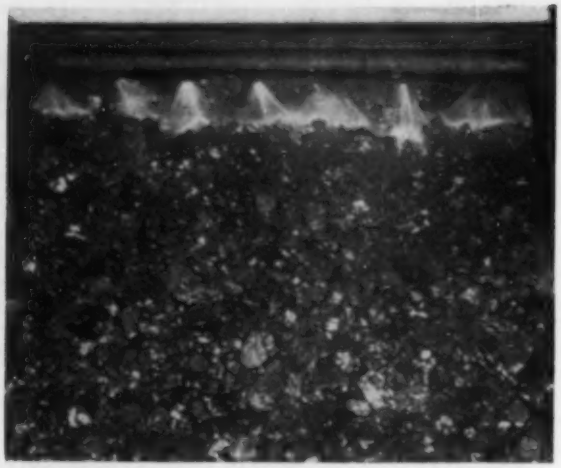
At the top of the plant the R-O-M coal passes over a stationary bar screen with 1¼-in openings and is adjustable so that approximately 25% of the minus 1¼-in coal can be fed into the rewash or middlings wash box so as to furnish a constant, uniform bed. The remainder of the R-O-M coal is fed directly into a No. 5 McNally-Norton 6-cell Baum-type jig washer. The secondary refuse (or the middlings) from the No. 5 washbox is crushed to minus 1¼-in in an American Ring Mill A.C.2 crusher and recirculated to the rewash or middlings washbox. This washer is a No. 4 McNally-Norton 5-cell Baum-type jig, and both the primary and secondary refuse from this box goes directly into the refuse bins.

Product from both washers is discharged through launders onto a two-section classifying shaker, the first section of which is equipped with lip screen with 1-in openings. The coal and water passing through the screen is discharged onto two 6x14-ft Allis-Chalmers Low-Head dewatering vibrators equipped with a BeeZee Tri Rod Deck with ¼-in openings. The screened 1x¼-in product is conveyed by drag conveyor to the track conveyor, where it can be loaded separately as stoker coal or, by means of the mixing conveyor, can be blended with other sizes. The water and material passing through the screen is circulated to the fine-coal recovery tank.

Through a system of doors in the second section of the classifying shaker and with the use of the 2-compartment mixing conveyor, a large variety of sizes may be produced. By means of the mixing conveyor, the various sizes can be blended or all or any part can be crushed to minus 1¼-in. Discharge from the 36-in McNally-Pittsburg stoker crusher may be conveyed by a gravity discharge elevator to an Allis-Chalmers 6x14-ft double-deck Ripl-Flo stoker vibrator for increased production of stoker coal, or it may be recirculated to the mixing conveyor for blending with other sizes. As previously mentioned, the flexibility of loading is a feature of the plant, making it possible to load any size coal at any time.

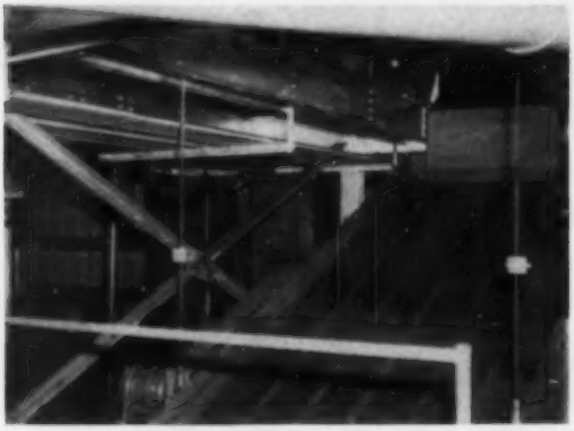
Primary and secondary refuse from the No. 4 washer and primary refuse from the No. 5 washer are discharged

1 **BAUM-TYPE JIG WASHER,** with six cells, cleans most of R-O-M from crusher and bar screen.

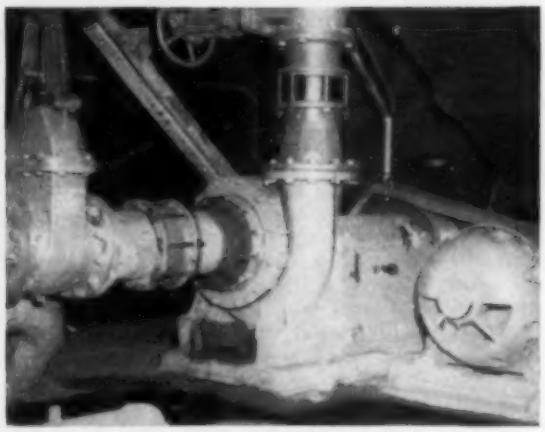


2 **SHAKER** splits coal from primary and middling jigs, feeding 6x0 to loading boom or mixing conveyor.

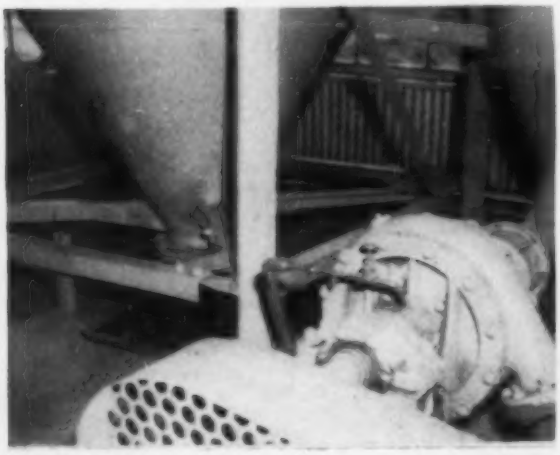
How P & M Takes Coal Through the Plant



3 **RESIZING VIBRATOR** produces stoker coal from re-crushing circuit or sends coal to mixing conveyor.

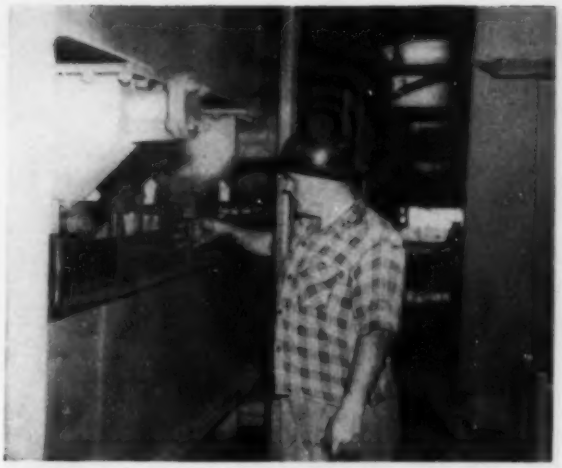


4 **SOLIDS CENTRIFUGAL PUMP** sends minus ¼-in material from fine-coal recovery tank to . . .

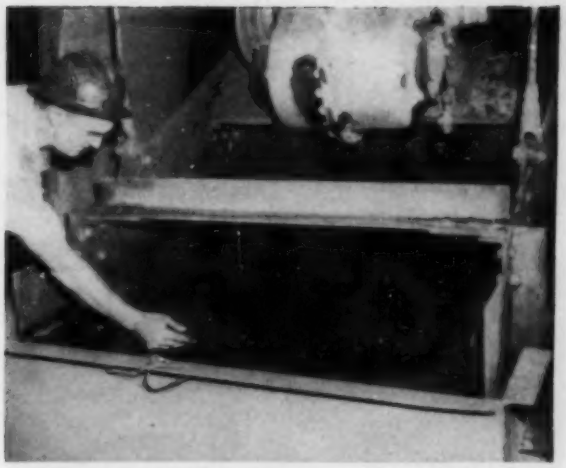


5 **CLASSIFYING CONE.** Bottom product of cone discharges to launder. Cone overflow is pumped to . . .

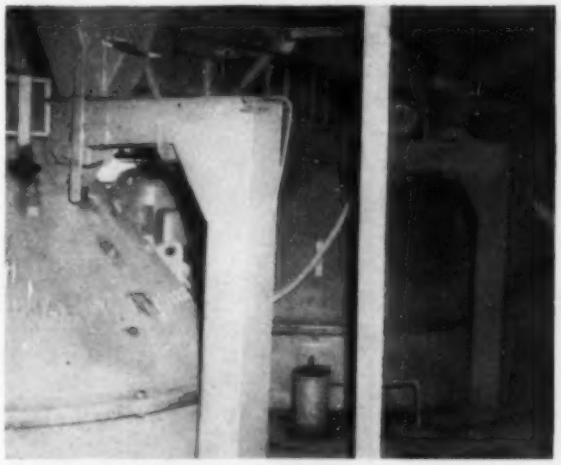
6 **BANK OF TWO CYCLONE THICKENERS** stands at right. Overflow recirculates to fine-coal recovery tank.



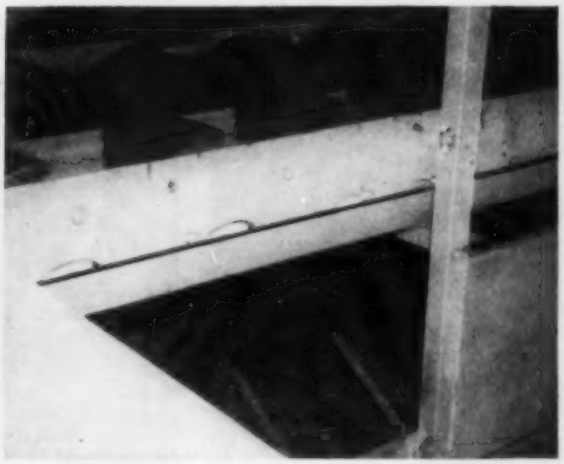
7 **LAUNDER,** free-discharge type, takes adjustable feed from classifying screen.



8 **DESLIMING VIBRATORS** take launder product. Fireclay and pyrites are sprayed out and coal goes to . . .



9 **CENTRIFUGAL DRIERS,** discharge from which goes by drag conveyor to track conveyors.



10 **MIXING CONVEYOR,** with two compartments, blends various sizes to suit needs of customers.

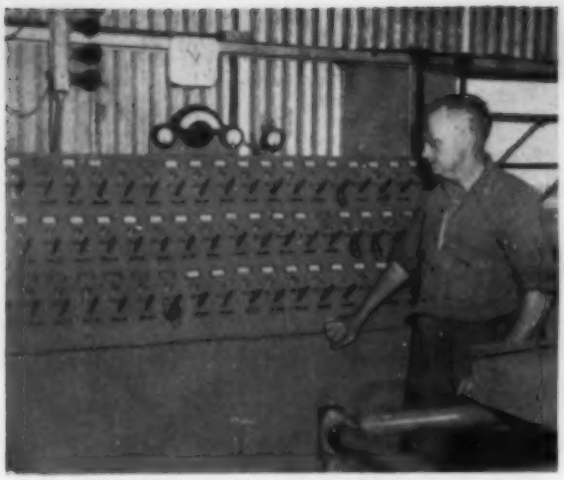
by gravity to refuse bins. A feature of the refuse disposal is that primary refuse from the No. 5 washer is discharged into a separate bin so that it can be utilized in constructing haulage roads. The remaining refuse is hauled to the pit and covered, eliminating stream pollution and sulphur fires.

RECOVERING FINE COAL

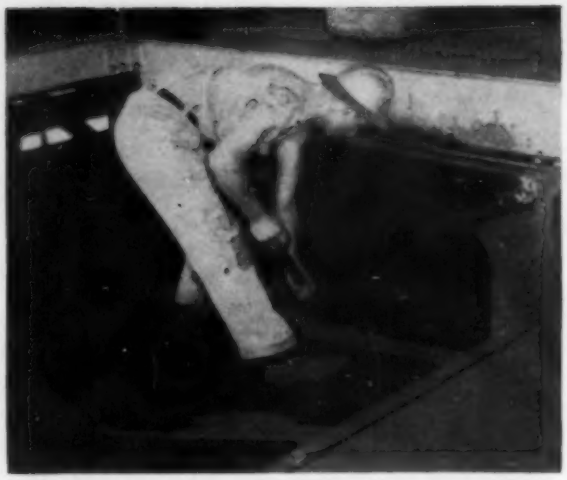
A feature of the fine-coal recovery circuit is that all waste material down to as small as plus 200-mesh is discharged in with the refuse, resulting in a minimum of sludge for disposal. This is accomplished to a great extent with cyclone thickeners in a closed circuit.

The minus ¼-in material, which settles in the fine-coal recovery tank, is moved by a fine-coal recovery drag into a pump sump and pumped by a 10x10-in McNally-Pittsburg solids centrifugal pump to a classifying cone 11 ft in diameter, located in the top of the plant, whence the cone discharge flows by gravity to a McNally Rheolaveur free-discharge type launder. The bottom of the cone is equipped with an adjustable orifice to regulate the feed to the Rheo launder. Overflow from the cone, which goes into a sump, is pumped by a 4x3-in McNally-Pittsburg solids pump to two 14-in Heyl & Patterson cyclone thickeners. The underflow of the cyclones goes directly to refuse, and the overflow is circulated back to the fine-coal recovery tank. In the original design and operation, the minus ¼-in material from the fine-coal recovery tank was elevated by a dewatering elevator to a drag conveyor which fed the Rheolaveur launder. The change was made after preliminary tests over a ¼-mm screen indicated a large percentage of fine fireclay and pyrite could be eliminated with a hydraulic classifying cone. The installation of a cone designed to make hydraulic separation at 60 mesh has borne out the results of the tests. Better stratification on the Rheo has resulted, and the efficiency has been increased considerably by the elimination of a high percentage of pyrite and fireclay from the Rheo washing circuit.

The product of the Rheo is distributed by gravity over three 4x10-ft Allis-Chalmers Low-Head desliming vibrators equipped with ½-mm Bixby-Zimmer Tri-Rod screens having three dams per screen. Fresh-water sprays are installed at this point to remove as much of the minus 60-mesh fireclay and pyrites as possible before being discharged to three McNally-Pittsburg centrifugal driers. The drier

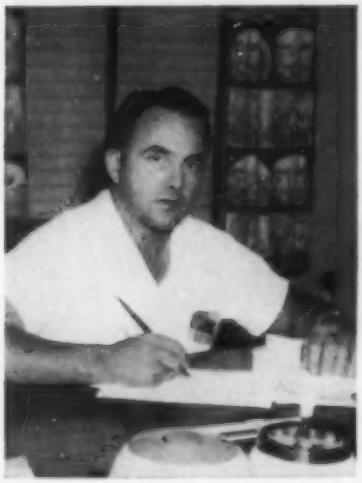


CENTRAL CONTROL PANEL provides one-place station for V. W. Smith, plant operator.



HOURLY SAMPLING, at washbox and elsewhere, assures close control of quality.

Controlling Plant and Supervising Operations



TOP OPERATING PERSONNEL at Mine No. 19 includes Edwin R. Phelps, vice president—operations (left photo); Emil Sandeen, mine superintendent; and Elmer H. Citron, preparation engineer.

discharge is fed to a drag conveyor, which conveys the coal to the track conveyors, where it may be loaded separately as ¼x0 or can be blended with sizes up to 1¼ in. The drier effluent is sluiced by gravity to a 3x6-ft Tyler vibrator equipped with ½-mm opening screen. The material passing through this screen and the material and water passing through the desliming screens are circulated to a slurry cone. Material passing over the Tyler vibrator is recirculated to the fine-coal recovery tank. The overflow from the slurry cone, containing approximately 200-mesh solids, goes to a sludge-pump sump and is pumped by a 10x10-in McNally sludge pump to a settling reservoir. Slurry from the cone underflow is pumped by a Morris 5-in slurry pump to a bank of five 14-in Heyl & Patterson cyclone thickeners. Overflow from the cyclones goes directly to the fine-coal recovery tank sump for recirculation and the underflow is fed to two 4x10-ft Allis-Chalmers Low-Head refuse vibrators equipped with ¼-mm BeeZee Tri-Rod screens. The material passing over the vibrator is discharged to the refuse bins and the minus material is circulated by gravity to the sludge-pump sump. The circuit is arranged so that the cyclone underflow can be circulated directly to the sludge sump if the vibrator fails. All sludge is pumped to a settling reservoir, from which the clear water flows into a fresh-water reservoir for recirculation to the plant.

LABORATORY CHECKS QUALITY

An important factor in maintaining quality at high level is operation of the plant under laboratory control. Samples of the washery product of the No. 4 and No. 5 washboxes are taken at hourly intervals and run through a float-and-sink test at 1.40 sp gr. Quality can be quickly checked from a curve showing the per-cent ash content in relation to the per-cent sink at 1.40 sp gr. The curve was plotted from numerous preliminary tests. When a fluctuation in ash content is indicated by the tests, adjustments are made by the washery operator to maintain the desired quality. A well equipped analytical laboratory is maintained where washability tests, proximate analyses, water analyses

and ash-fusion tests are made. Screenings are sampled periodically and complete proximate analyses made of each car.

At present, two different seams of coal, Fleming and Mineral, are being mined (see p 80) and cleaned. Each seam requires different washbox adjustments. Normally each seam is washed separately, but when necessary the two seams can be blended. Laboratory control curves have been established for the different seams.

All sizes of coal may be oil-treated. No. 5 crude oil, stored in a tank located in a building adjacent to the plant, flows by gravity to the Viking oil-treating equipment, where it is headed and pumped under pressure to the loading booms. The oil is heated by steam from a Kewanee 150-hp boiler fed by a Winkler stoker located on the ground floor of the plant. The boiler also supplies steam for the central heating system serving the plant and the other buildings. The booms handling coal larger than 1¼-in are equipped with chutes that automatically change the flow of the coal when the booms are raised so that the railroad cars can be changed without stopping the booms. The flow of coal smaller than 1¼-in from one car to another is accomplished through remote control by an electric motor that operates the door of the divided chute.

MAINTAINING THE PLANT

Years of operating experience have proved that maintenance is an important and integral part of the over-all operation. Accordingly, a preventive maintenance program has been established that has held costly operating lost time to an almost negligible percentage, thereby boosting production and efficiency. A regular maintenance crew consisting of two men reports to work 2 hr before the end of the loading shift so that a daily inspection can be made of the plant while it is in operation. The entire operation is carefully checked, with special attention given the equipment which, because of its particular function, is subjected to greater wear. For example, the screens of the centrifugal driers are checked daily by inspecting the drier effluent on the Tell-Tale vibrator screen. If oversize material is observed, the driers are checked when the plant shuts down and all worn screens are replaced. By the plan, all parts of the plant are given regular, thorough, periodic inspections. For instance, once each week the 48-in drag conveyor is checked. Every link, pin and nut is carefully examined, with worn parts being replaced and loose nuts spot-welded. Plant employees assist the crew by reporting maintenance work they feel is needed.

The washery operator makes a daily inspection of the washboxes, and every week the sieve screens are checked for wear and looseness. After every 100 hr of operation the washbox floats are rebalanced and the impulse valves are inspected and cleaned. A washer adjustment log, prepared by the engineering department, is kept on all washboxes and close co-operation is maintained between the washery operator and the coal preparation engineer, Elmer H. Citron. Under his supervision many improvements have been made in the washboxes, including the redesign of several washbox parts, which has resulted in greater efficiency through reduced maintenance. The entire operating staff is constantly searching for improved methods and materials, and through a program of study and research many improvements have been made throughout the operation that have resulted in reduced costs and improved quality of product.

PLANNING PLANT UPKEEP

A diary is maintained by the crew recording the work that is done each night and the conditions that indicate the necessity for major maintenance work. When such work is indicated, the loading schedule is arranged so that the plant will be idle for the required amount of time, and the loading crew can be utilized to assist the maintenance crew and the regular shop crew with the work. A record of the labor and material entered in the diary is posted daily by the plant superintendent on file cards maintained for each unit of the plant. By use of the diary, the storekeeper can maintain the necessary stock of parts and supplies and the mine superintendent can plan maintenance work efficiently.

The plant and all the equipment is painted regularly to encourage good housekeeping and proper upkeep. As a result of the preventive maintenance program, lost operating time due to mechanical failures has been held to a low of 0.8% of total operating time during the last 6-mo period.

The storeroom is an important factor in the maintenance program. An adequate stock of supplies and replacement parts must be kept on hand at all times but at the same time it is desirable to keep the inventory at a minimum.

A shop well equipped to handle all maintenance work for the plant and pit operations is located at the plant. In addition to routine maintenance work, special equipment such as pinning machines and drill rigs are fabricated and constructed at the shop. At the present time a new rotary air type prospect drill rig under construction is almost completed. The rig was designed by Elmer H. Citron who, in addition to being in charge of coal preparation, also serves as mechanical engineer.

All electrical work and maintenance is under the supervision of Howard J. Garrison, chief electrician, who conducts his shop, located adjacent to the machine shop, on the theory that it is a "sanitarium" and not a "hospital." An attempt is made to change electrical equipment before failures occur, and as the record of only 35 min delay in the last 650 hr of operating time will verify, the policy has been successful.

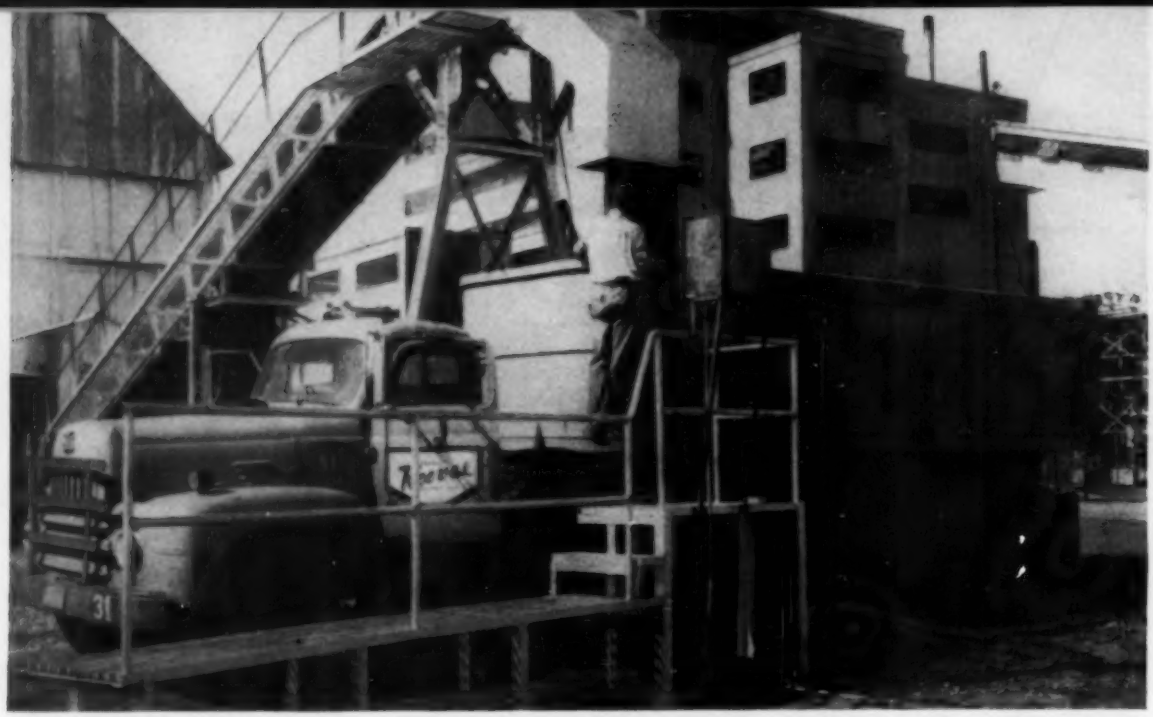
SAFETY A MAIN TARGET

Safety, which is backed wholeheartedly by top management, is considered an integral part of the operations and every effort is made to eliminate work hazards and to encourage employees to work safely. Regular safety meetings are held on company time (*Coal Age*, July, 1949, p 97) and annual contests and family safety meetings are conducted. All men are encouraged to take part in the safety meetings, some of which are planned and conducted by the mine safety committee. The program, set up on the Safety Sponsor Plan, has resulted in splendid employee relations. The mine was the first open-pit operation in the state of Kansas to be in complete compliance with the Federal Mine Safety Code.

The supervisory staff at the plant, in addition to those already mentioned, are Emil Sandeen, mine superintendent; Lanpher Nifong, plant superintendent; and L. K. Moore, mine engineer. C. F. Irwin is chief engineer; W. C. Spencer, assistant chief.

Company officials consist of Harold H. Spencer, chairman of the board; Kenneth A. Spencer, president; E. R. Phelps, vice president in charge of operations; Frank Barrow, vice president in charge of sales; Henry J. Hofmeister, treasurer; and John P. Miller, secretary.

Although constructed and placed in operation during the period of a shrinking coal market, the production of the plant has substantiated top management's thinking that with good equipment and the proper know-how, resulting in an efficiently produced quality product, coal can still be a strong competitor in today's highly competitive fuel market.



COAL-HANDLING COST CUTS for customer are aim of truck transport from preparation-plant storage bin to customer's stockpile. Automatic weighing controls on platform stop flow of coal into truck when pre-set tonnage is loaded.

P & M Cuts Cost for Customer

How Pittsburg & Midway adapts mine-to-market delivery methods to suit the convenience of a good customer and help him save on coal-handling costs

By F. J. FORESMAN, Director, Industrial Relations
The Pittsburg & Midway Coal Mining Co., Pittsburg, Kan.

A REDUCTION in coal-handling costs by the adoption of a coal delivery service proposed by The Pittsburg & Midway Coal Mining Co. has resulted in substantial savings to a major utility consumer and additional tonnage for the company's Mine No. 19, located near Hallowell, Kan.

Developed by Edwin R. Phelps, vice president in charge of operations, the service was the direct outcome of a survey made to determine if additional markets could be secured by truck haulage direct from the mine or if present customers could be more efficiently and economically served by that method of delivery. Although the study disclosed that the cost of transportation from the mine to the consumer was practically the same for both rail and truck haulage, it was indicated that a reduction could be made in handling costs at the consumer's plant by means of truck delivery. Coal shipments by rail had to be unloaded with a clamshell crane into a large storage area and then reloaded into hopper-bottom cars for transfer to the power house.

Under the new system, the coal is sold on a cost-per-million-Btu basis delivered on a conveyor going into the power plant, completely eliminating the use of the crane, drop-bottom railroad cars, switch engine, 'dozer, car unloader shaker and a labor crew of from five to seven men required for loading and unloading cars and processing the coal. It also resulted in other savings through the reduction of physical and thermal losses.

To provide the mine-to-consumer truck delivery service, it was necessary to construct a double-pocket hopper coal storage bin of 800-tons capacity which, supplemented by the 150-ton custom-coal bin already in existence, provided storage for a maximum of 950 tons of coal. The 800-ton storage bin was designed by Elmer H. Citron, mechanical and preparation engineer, in cooperation with Mr. Phelps, and was constructed under the joint supervision of Mr. Citron and L. Kenneth Moore, mine engineer.

BUILDING A NEW BIN

The new bin, located adjacent to the custom-coal bin, was constructed of reinforced concrete and structural steel. The construction consists of a reinforced concrete pit with walls extending 14 ft above the pit floor and 10 ft above the ground elevation. The steel bin walls, which are 14 ft in height, are anchored to the rim of the concrete walls and are constructed of fabricated steel plates and I-beams. The floor of the pit was purposely constructed 4 ft below the ground elevation to prevent the coal from freezing in the hopper pockets in cold weather.

Coal is fed to the new bin by a 36x12-in drag conveyor located over the top of the bin and extending at right angles from the 36x12-in drag conveyor that feeds the custom-coal bin. By means of a gate at the discharge end of the custom-coal bin drag, the coal can be discharged directly into the custom-coal bin or

COAL COMPANY'S BIG SCRAPER compacts stockpiled coal and, on demand, loads coal from stockpile into steam-plant hopper at substantial cost savings below conventional coal-handling methods.

to the other drag conveyor, which discharges into the new bin.

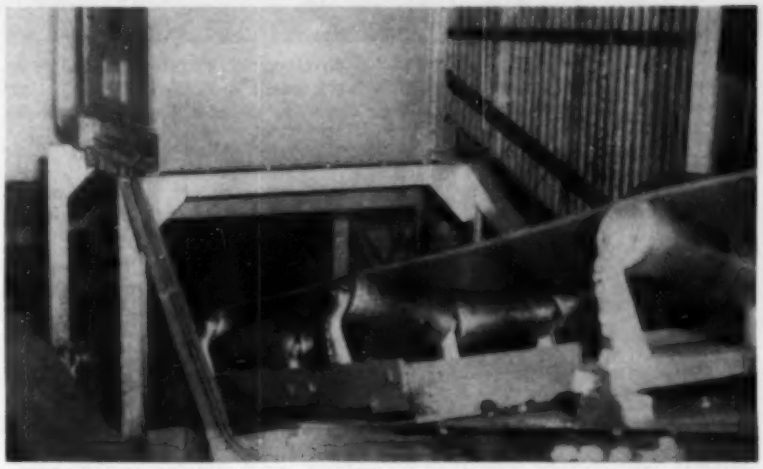
COAL AUTOMATICALLY WEIGHED ON CONVEYOR

Coal is fed from the double-pocket hopper to a 30-in belt conveyor by two 3x10-ft reciprocating plate feeders. The feeders are connected in tandem and are driven by the same motor, so that only one feeder at a time discharges onto the belt. Midway between the tail and head sections of the truck-loading belt conveyor, the conveyor passes over a Merrick Automatic belt scales, which automatically weighs the coal and is a feature of the loading operation. With the automatic scales, a maximum load can be hauled every trip without having to take time to weigh and decrease or increase the load, because the conveyor automatically delivers the tonnage set by the truck operator by remote control at the truck-loading station. This arrangement substantially increases the tonnage that can be hauled per day.

All the haulage is done by an independent contractor, whose equipment consists of five semi-trailer units powered by Model L185 International tractors. The trailers are manufactured by the Body and Hoist Div., Marion Metals Products Co., Marion, Ohio, and are equipped with a hoist lift for end dumping. The distance from the mine to the consumer is 27 mi. A maximum load of 17 tons is hauled per unit, which is the weight allowable for that type unit under the state laws.

HANDLING COSTS CUT

Coal delivered to the consumer is unloaded directly into the power-plant receiving hopper or in a storage pile, depending upon the demand of the power plant. During the period when natural gas is used as fuel, all the coal is unloaded in the storage pile and is used to supplement the truck deliveries during the period of peak demand. A specified amount of coal is kept in storage at all times in the main storage area and a smaller amount is maintained adjacent to the receiving hopper. A Euclid Model 23TDT-21 SH Scraper, struck capacity 15½ cu yd, is used by the coal company to compact the coal in storage and to transport the coal from the storage pile to the receiving hopper. With the use of the scraper the coal can be compacted to approximately 70 lb per cubic foot, making it possible to store a larger volume of coal in the same storage area and also greatly reducing the danger of firing by spontaneous combustion. The scraper is used for transporting coal in accordance with the fuel requirements of the power plant.



CONVEYOR from cleaning-plant storage pit to truck-loading station is hinged for operation of automatic scales.

A Caterpillar D-7 'dozer is maintained as standby equipment to feed the hopper from the storage pile adjacent to it in the event of any emergency, such as an increased demand for coal or a breakdown of some of the other equipment. One man, employed by the coal company, operates the equipment and supervises the stockpiling and delivery of coal to the hopper.

All coal delivered to the power plant is weighed by a Merrick Automatic belt scales similar to the equipment used by the coal company. Purchase statements are issued on the basis of the tonnage recorded by the scales.

Delivery of coal by truck is probably not feasible for many industrial coal users. However, where it is indicated that such service could be adopted, it offers coal producers an opportunity to boost sales through the potential savings to the consumer in coal-handling costs.

PROTECTED BY BOLTS installed in top development, loading machine is removing bottom coal. Floor of top-bench development is above and behind loading machine. Alternate form of loading (Fig. 2) is use of a three-drum scraper.

Top Benching Solves Thick-Coal Problem

New approach to mining thick coal, made possible by roof-bolting, permits working from top of seam down for better recovery, safety and efficiency.

A REVERSAL in the usual way of doing things, made possible by roof-bolting is increasing extraction, safety and efficiency in mining thick coal at Kingmine of the United States Fuel Co., Hiawatha, Utah. Instead of developing the bottom and then taking top coal and pillars, the process has been reversed to provide for development in the top of the seam and partial pillaring, all accompanied by bolting, which also provides positive and relatively inexpensive protection during final recovery of the bottom coal and the remainder of the pillars.

The operations at Kingmine are in a thick coal bed known as the Hiawatha seam, which is overlain by 40 to 150 ft of massive sandstone, above which is approximately 2,000 ft of sandstone and shale strata.

Kingmine is 100% mechanized with six production units, each made up as follows:

1 Joy 11-BU loading machine.
1 Sullivan 10-RU cutting machine.
1 Sullivan CD-18 rubber-tired drill.
2 60-E cable-reel shuttle cars.
1 Joy elevating conveyor.

Roof-bolting for the six units is done with four Ingersoll-Rand I-R-40 stopers and two Sullivan Drillmobiles. The Drillmobiles are used where the bolting demand is the greatest. Where conditions favor, two 60-hp, 3-drum scraper hoists, each equipped with a 2-ton bucket traveling at 200 fpm are used to load bottom and pillar coal. Otherwise, this loading is handled by the regular machines.

TOP BENCH EVOLUTION

A number of mining plans based on development in the bottom bench have been tried over the years at Kingmine. None were completely satisfactory. In the main, these plans consisted of two variations of the following:

1. Driving rooms in the bottom bench approximately 9 ft high and then shooting down the top coal in lifts starting at the face. In the initial stages, this plan provided high tonnage at low cost, but after a time, the weight of the overburden balanced on the tops of the pillars resulted in a ride or creep, with consequent loss of pillar coal, low over-all recovery, hazardous working conditions at times, and considerable cost to the company.

2. Driving rooms and other openings in the bottom bench and then recovering both top coal and pillars. Fig. 1 illustrates the latest of these plans developed and used before top-bench development was adopted. As with Plan 1, operation in the initial set of rooms resulted in high recovery, high production and safe working conditions. But by the time the second set of rooms was well under way, however, pressure developed outby the pillar area, causing the top coal to loosen and fall. Bounces or bumps were frequent, resulting in broken timbers, caves and heaving floor.

One other difficulty encountered in removing coal under both plans was the loss of large piles of loose coal after it was shot down for loading as a result of falls of roof or cap rock on the coal. Securing the roof in openings of the height encountered was prohibitive from both the time and expense standpoints.

Experience in a section started in February, 1952, led to the decision to try top-bench development. Development of this section was completed and pillar extraction started in August, 1952. Seven of the 60x60-ft pillars had been mined when pressure showed up in the haulage opening 300 ft outby the pillar line. The roof coal broke between the timbers and the ribs, leaving 2 to 6 ft of coal on the crossbars entirely free of the ribs on each side. Bouncing also started, and many of the timber legs were kicked out, dropping both the crossbars and the loose coal. Roof falls in the haulage openings stopped pillar operations.

TOP DEVELOPMENT STARTS

In the light of these experiences it was decided to go to top development at Kingmine, with the advice and assistance of the U.S. Geological Survey, which has long cooperated with Kingmine management in the evolution of plans designed to increase recovery with high efficiency and safety.

To start the program at Kingmine, the management, headed by George R. Watkins, general manager; T. C. Jackson, general superintendent; R. W. Ramey, assistant general superin-

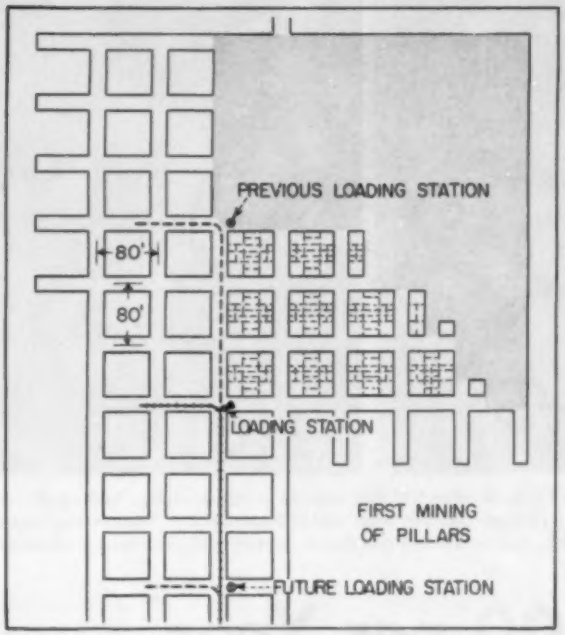


FIG. 1—TOP-BENCH PREDECESSOR was this plan aimed at higher recovery and more safety in bottom development.

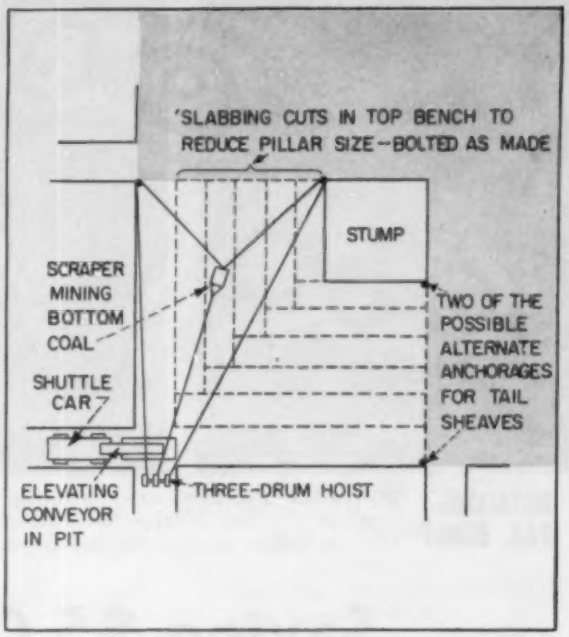


FIG. 2—SCRAPER RECOVERY of pillar after top-bench development using same general plan of openings as in Fig. 1.

tendent; and Merlynn Anderson, engineer, pulled back out of the last section, recovering track and other materials. Then, starting at the bottom of the entries, they graded up through the top coal to the roof, and advanced back into the section, shooting the top coal down to fill the openings and using that coal as a roadway.

The key to this method was roof-bolting as development proceeded under the top rock. Slot-and-wedge bolts 6 ft long, secured from the Colorado Fuel & Iron Corp., were installed, first on 4-ft and then on 5-ft centers. To increase roof coverage, 4x8x36-in headers were used under the plates.

This plan made it possible to drive back and reach all of the old pillar line, where the stumps were reduced in size, working along the top rock, and then the bottoms of the stumps and the loose coal in the rooms and crosscuts was recovered by ramping down with loaders and shuttle cars or pulling it out with a specially designed scraper and 3-drum hoist.

PILLARING FROM THE TOP

It is expected that the general mining plan employed in the original section and shown in Fig. 1 will be used in new development in the top bench. Fig. 2 shows recovery of an individual pillar with the scraper, but loaders and shuttle cars also can be employed by ramping down, since experience in the initial section has shown that both loaders and cars operate well on grades up to 12%.

After rooms and crosscuts are developed in the top bench, with bolting done as the places advance, the first step is to cut down the top section of the 60x60-ft pillar, as shown in Fig. 2. This reduction is accomplished by slabbing the two outby sides of the pillar alternately until it is reduced to approximately 25x25-ft at the corner next to the gob. This leaves an L-shaped area of bottom coal containing up to 3,000 tons. Each slab is bolted as it is made, thus completely securing all the exposed top, not only for this operation, but also for subsequent bottom-coal recovery.

The next step, where the scraper is employed for final recovery, is to set anchor points for the two tail sheaves about as shown in Fig. 2. This permits the scraper to pull from any point in the bottom coal area and discharge to the shuttle cars in the next crosscut back. To take the bottom coal in what was the old crosscut, the sheave anchors are changed to permit routing the scraper around the corner, as indicated in Fig. 2. The bottom coal also can be removed with the regular loaders and shuttle cars by ramping down.

A specially designed open-bottom scraper with a capacity of 2 tons is used for mining the bottom coal. It is equipped with a swinging back gate equipped with long teeth to rip up the coal. It also is provided with the teeth on the outside to enable it to dig sideways into the ribs. The design is such that shooting of the bottom coal seldom is required.

A further modification to meet conditions involved in this type of mining was the addition of a shroud or hood over the back end of the scraper. Thus, as the scraper fills, coal boils up into the hood and lifts the scraper up out of the coal mass for the haul to the discharge point. Otherwise, it would attempt to stay down in the coal all the way.

To facilitate transfer of coal from the scraper to the shuttle cars, the present plan is to cut a sloping pit down into the bottom coal immediately in front of the scraper hoist and set a specially designed elevating conveyor in it, as shown diagrammatically in Fig. 2. This elevator will take care of lifting the coal up and placing it in the shuttle cars, which will back under the elevated end. The conveyor idea has been arrived at because the long teeth on the scraper prohibit using the usual ramp on which the scraper would slide up to the discharge point.

As noted, the key to the plan is the opportunity for bolting all the top as soon as it is exposed, thus providing positive protection until pillaring and removal of the top and bottom coal is completed. The stumps at the gob corners of the pillars are left and, if necessary, are shot to break them down and leave the roof free to cave.

INSTALLING RAIL BONDS

PORTABLE GRINDER driven by flexible shaft is used to prepare rail for bonding (left). Adding sleeve terminal to a piece of copper cable (center) is done quickly with aid of hammer die. Welder and bond then are clamped to clean rail (right). Welding materials are powdered copper and powdered aluminum.

Saving $5,000 per Year

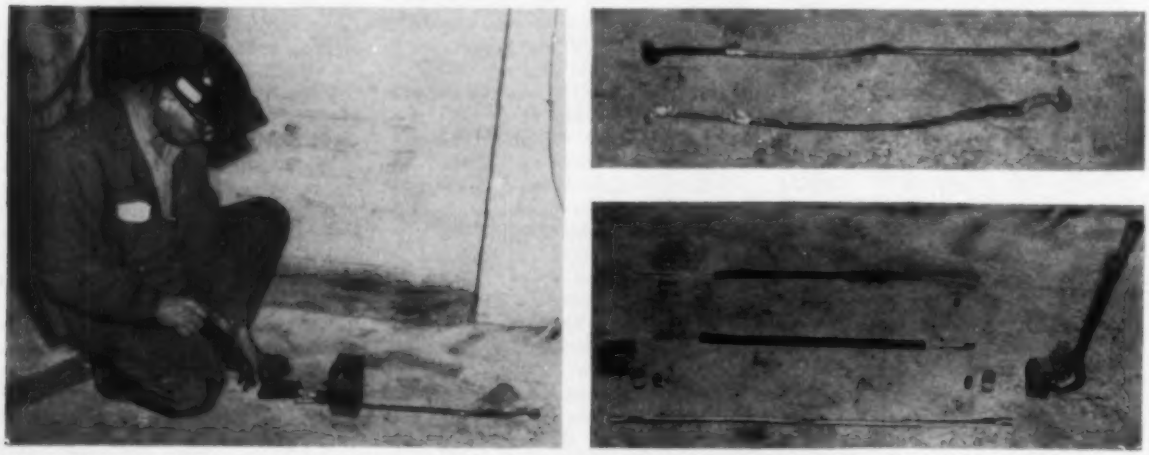
How repairing damaged bonds and making new ones from scrap trailing cable and new 4/0 copper has cut supply cost at J&L's Vesta No. 5 mine.

SALVAGING AND REPAIRING broken bonds, making temporary bonds from scrap trailing cable and permanent ones from 4/0 cable purchased in 1,000-ft rolls has resulted in an estimated savings of $5,000 per year at the Vesta No. 5 mine of the Jones & Laughlin Steel Co. The program had its beginning early in 1954 when the salvage program was adopted as a temporary measure. However, the results were so impressive that bond-making has become standard practice.

Under the salvage program, no damaged bonds are considered as scrap until they have been brought to the underground shop and inspected. It is unusual when one cannot be salvaged. Sections of damaged or scrap trailing cable no longer are headed for the scrap pile, but serve as a stockpile for making temporary bonds.

Where new weld-type bonds are needed for permanent installations in Vesta's haulage system, they are fabricated from 61-strand 4/0 copper cable and special sleeves.

For some time, Vesta had been using the Cadweld process for splicing feeder cable and making permanent splices in trailing cables. It was suggested that the process be used to reclaim bonds which had one end cut



FABRICATING NEW BONDS

READY FOR WELDING are two salvaged sections of bonds. Two men have reclaimed up to 80 in one shift. Reclaimed bonds (top, right) have better conductivity and strength. Other money savers are bonds made from salvaged cables (top and center, lower photo) and 4/0 copper cable (bottom).

WELDING ACTION is started by igniting aluminum with flint gun. Molten copper fuses terminal to rail.

TEMPORARY BOND is made from scrap trailing cable. Sleeve fits over conductors and is wedged into place.

REMOVING damaged terminal prior to adding a new one is easy with the aid of a large wire cutter.

off or damaged. By cutting off the damaged ends of two bonds and joining them by the copper-welding process, a bond as good as new could be made. The only cost involved would be the labor and the cost of the welding material, which was very low. At the same time it was suggested that scrap trailing cable be used to make either wedge-type or weld-type bonds for secondary track. It also was pointed out that the cost of the bonds made from scrap cable would be the scrap value of the cable plus the labor and materials needed for assembling the units.

The idea appealed to Vesta management and the salvage program was pushed forward. As soon as possible, cost figures for making the bonds were assembled and compared to what would have been spent for a new unit.

WELDED SPLICE is stronger than original trailing cable and has better conductivity because joint is solid.

Seven different sizes and types of bonds are made, with savings ranging from 50½c on a 34-in weld-type made from new 4/0 cable to $1.88 on a wedge-type 54-in bond made from scrap cable.

Here's how Vesta management figures the savings on each type of bond. Scrap cable is valued at the going scrap-copper price of 17c per lb, or 8½c per ft, and labor cost per bond is calculated on the basis of the number of bonds made in one shift by one man whose wages are $18.25.

One man can make 60 wedge-type or 40 weld-type bonds from scrap cable in one shift, and he can make 50 new bonds from 4/0 copper cable. That figures out to 31c per wedge-type, 45c per weld-type and 36½c per new 4/0 bond. Bond terminals cost 10c each and are copper sleeves fitted over the ends of the cable.

A breakdown of the savings achieved by making the various types of bonds is as follows:

1. **Wedge-Type 36-In Bond Made From Scrap Cable**

Scrap cable	$0.25½
Sleeves (2)	0.20
Labor	0.31
Total	$0.76½
Purchased bond	$1.89
Savings per bond	$1.12½

2. **Wedge-Type 54-In Bond Made From Scrap Cable**

Scrap cable	$0.38
Sleeves (2)	0.20
Labor	0.31
Total	$0.89
Purchased bond	$2.77
Savings per bond	$1.88

3. **Weld-Type 36-In Bond Made From Scrap Cable**

Scrap cable	$0.25½
Sleeves (2)	0.20
Labor	0.45
Total	$0.90½
Purchased bond	$1.89
Savings per bond	$0.98½

4. **Weld-Type 54-In Bond Made From Scrap Cable**

Scrap cable	$0.38
Sleeves (2)	0.20
Labor	0.45
Total	$1.03
Purchased bond	$2.77
Savings per bond	$1.74

5. **Weld-Type 34-In Bond Made From New 4/0 Copper Cable**

Cable	$1.02
Sleeves (2)	0.20
Labor	0.36½
Total	$1.58½
Purchased bond	$2.09
Savings per bond	$0.50½

6. **Weld-Type 42-In Bond Made From New 4/0 Copper Cable**

Cable	$1.22½
Sleeves (2)	0.20
Labor	0.36½
Total	$1.79
Purchased bond	$3.21
Savings per bond	$1.42

7. **Weld-Type 54-In Bond Made From New 4/0 Copper Cable**

Cable	$1.57½
Sleeves (2)	0.20
Labor	0.36½
Total	$2.14
Purchased bond	$3.83
Savings per bond	$1.69

FEATURES:

Classifying and froth-flotation for cleaning

Launder screens for conditioning feed

Cyclone-and-vibrator dewatering of flotation coal

Efficient water-supply and conservation facilities

HIGHLAND NO. 5 FINE-COAL PLANT, a modernized portion of an existing structure, provides spacious quarters for cleaning equipment.

Jeddo-Highland's Fine-Coal Plant

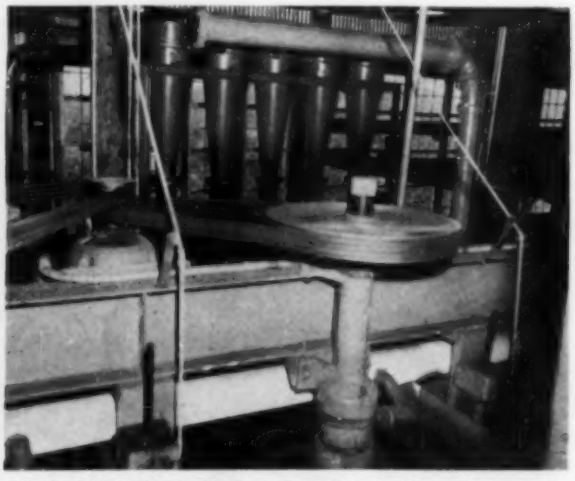
By HAROLD DAVIS
Associate Editor, COAL AGE

NEWEST OF THE FINE-COAL CLEANING FACILITIES in the anthracite region, the Highland No. 5 plant of the Jeddo-Highland Coal Co., Jeddo, Pa., is producing from 115 to 120 tph in Nos. 4 and 5 Buckwheat sizes, from feed recovered from two silt deposits laid down in the past in the Jeddo area. These two deposits will support operation of the plant for at least 10 yr at present levels of operation. Additional reserves are available in other adjacent areas.

The fine-coal cleaning units were built into a portion of an existing plant, Jeddo-Highland's No. 5 breaker. All original equipment was removed, half the plant was razed and the other half substantially rebuilt to house the new processes which include (1) launder-screening for preparing feed for the cleaning units, (2) froth flotation and classification for cleaning and (3) combined cyclone-and-vibrating screen dewatering for the flotation product. Underpinning the whole operation is an excellent water supply in a deep-mine reservoir, which is further improved through the installation of efficient pumping units and flexible recirculation units. Water conservation is important.

Engineering detailing and construction work was done by Wilmot Engineering Co., after collaboration on the flow sheet with E. M. Robinson and J. J. Halpin, superintendent of preparation and mechanical engineer, respectively, of Jeddo-Highland Coal Co., and W. T. Turrall, consultant. G. Klingerman and O. E. Kenworthy supervised electrical installations. Top management's interest in this major project was shared at Jeddo-Highland by Donald Markle, president; C. A. Garner, vice president in charge of operations; W. C. Jones, vice presi-

STATIONARY LAUNDER SCREENS, on 1½-in-12 pitch, separate sizes in feed stream and adjust solids-water ratio.



14-IN CYCLONES thicken the clean-coal product of the flotation cells prior to final screening.

dent and general superintendent; and Donald Markle Jr., assistant general superintendent.

CLEANING RESULTS

The No. 4 coal, cleaned in a 7-ft Wilmot Hydrotator, shows up as follows:

Size	Wt., Per Cent
Plus 3/8	11.00
Plus 3/64	72.90
Plus 20 M	1.80
Plus 40 M	12.30
Minus 40 M	2.00
	100.00

These results were obtained within the first 30 shifts of operation, and Jeddo-Highland officials planned to effect a reduction in the amount of minus 3/64-in material to 10% or lower by adjustment of the launder screens on which the feed for the hydrotator is prepared. Ash in the No. 4 clean coal is averaging 9.7% in this early period.

Size consist of the No. 5 clean coal, averaging 10.5% ash, is as follows:

Size	Wt., Per Cent
Plus 14 M	3.60
Plus 20 M	14.40
Plus 40 M	48.00
Plus 60 M	19.80
Plus 80 M	6.30
Plus 100 M	2.60
Minus 100 M	5.30
	100.00

This Buck No. 5 coal is a blend of products in the following proportions: 15% from the second deck of the 7-ft Wilmot Buck No. 4 hydrotator dewatering screen, 65% from the 16-ft Wilmot hydroclassifier and 20% flotation coal from the six 56x56-in Denver No. 30 "Sub A" flotation cells with double overflow.

The Buck No. 5 from the hydrotator and hydroclassifier are blended with the flotation coal but the Buck No. 5 and flotation coal may be loaded separately.

Typical analysis of the feed to the flotation conditioner shows:

Size	Wt., %	Ash., %
Plus 20 M	0.24	11.8
Plus 40 M	9.12	15.8
Plus 60 M	37.64	24.1
Plus 80 M	19.60	29.5
Plus 100 M	14.16	36.4
Minus 100 M	19.24	47.6
Cumulative	100.00	30.9

Analysis of the clean coal from the flotation cells shows the following:

Size	Wt., %	Ash., %
Plus 40 M	5.24	6.5
Plus 60 M	30.24	7.5
Plus 80 M	20.44	8.2
Plus 100 M	16.72	8.9
Minus 100 M	27.36	18.4
Cumulative	100.00	11.0

PROVIDING PLANT FEED

The two silt basins presently being recovered are located in the immediate vicinity of the plant, one within ½ mi and the other somewhat farther away. In some areas the silt proved to be as much as 65 ft deep.

The raw material is loaded into trucks by a power shovel for removal to the plant feed hopper. A 10x10-in grizzly over the hopper retains large pieces of material that had been used to raise the retaining banks of the basins as the silt was deposited.

The material in the larger deposit contains 65.87% recoverable coal on the basis of float-sink tests at 1.70 sp gr as shown here.

Size	Wt., Per Cent	Float, Per Cent	Sink Per Cent
Plus 3/8	0.08	40.00	60.00
Plus 5/16	0.16	74.00	26.00
Plus 3/16	0.32	80.00	20.00
Plus 3/32	2.09	86.50	13.50
Plus 3/64	14.52	83.63	16.37
3/64×200 M	77.88	66.14	33.86
Minus 200 M	4.95	—	—
Cumulative	100.00	65.87	34.13

Raw material from the smaller silt basin, also float-sink tested at 1.70 sp gr, contains 67.68% recoverable coal as follows:

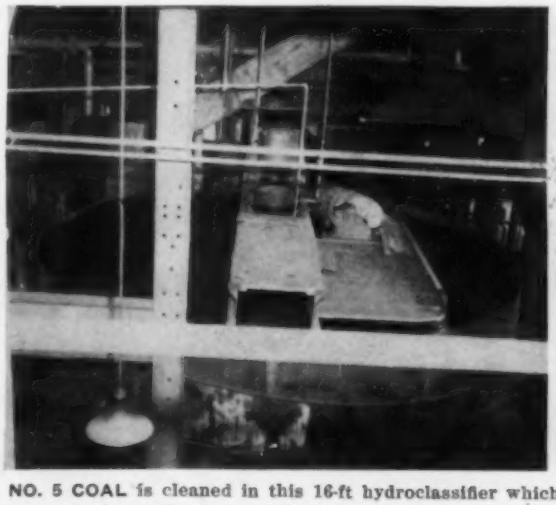
Size	Wt., Per Cent	Float, Per Cent	Sink, Per Cent
Plus 3/8	0.48	16.67	83.33
Plus 5/16	0.48	50.00	50.00
Plus 3/16	0.97	75.00	25.00
Plus 3/32	7.00	75.35	24.65
Plus 3/64	17.60	81.56	18.44
3/64×200 M	65.88	71.35	28.65
Minus 200 M	7.59	—	—
Cumulative	100.00	67.68	32.32

CLEANING THE COAL

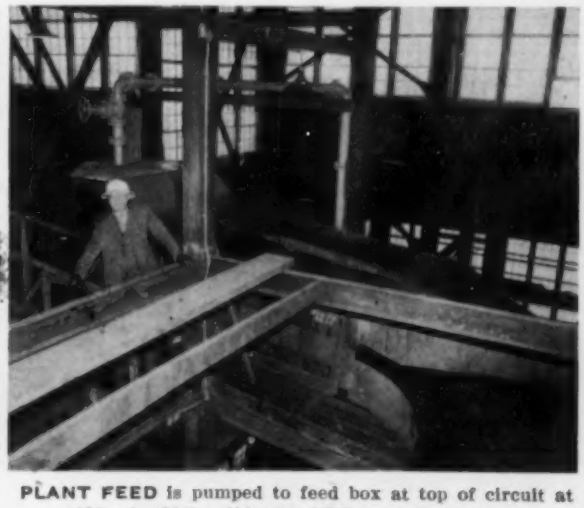
Feed for the plant is removed from the bottom of the dump hopper by a push feeder and discharged into an elevating flight conveyor which transports 200 tph into the plant.

As shown in the flow diagram, the feed conveyor discharges to a 3-ft and 4x15-ft double-deck scalping shaker to remove the plus ⅞-in material which is immediately conveyed to the refuse bin. The underflow of the scalping shaker, making up the feed for the cleaning units, is sluiced into a steel sump for pumping to the top of the cleaning circuit.

The main feed pump is a 3,600-gpm Hazleton Type VS slush pump with a 150-hp, 440-v motor, pumping the feed at 20% solids, 200 tph, through a



NO. 5 COAL is cleaned in this 16-ft hydroclassifier which receives 103 tph to produce 76 tph, clean coal.

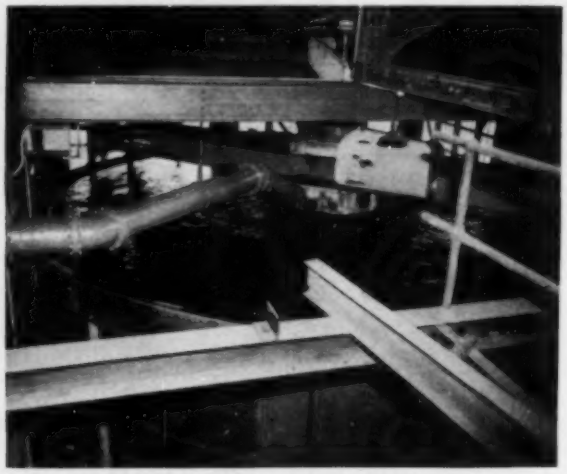


PLANT FEED is pumped to feed box at top of circuit at 200 tph (20% solids) by 3,600-gpm slush pump.

SPIRAL CLASSIFIER deslimes and dewaters 48-tph feed for the 7-ft hydrotator cleaning No. 4 coal.

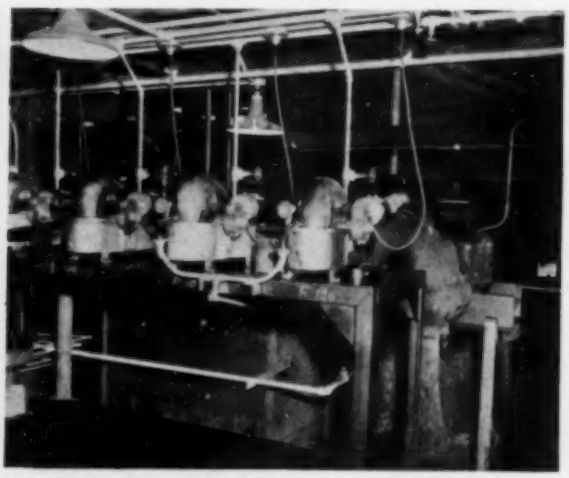
DOUBLE-DECK SHAKER dewaters hydrotator product and separates Nos. 4 and 5 fractions.

SIX FROTH-FLOTATION CELLS, with double overflow, produce 31-tph flotation coal from 37-tph feed.

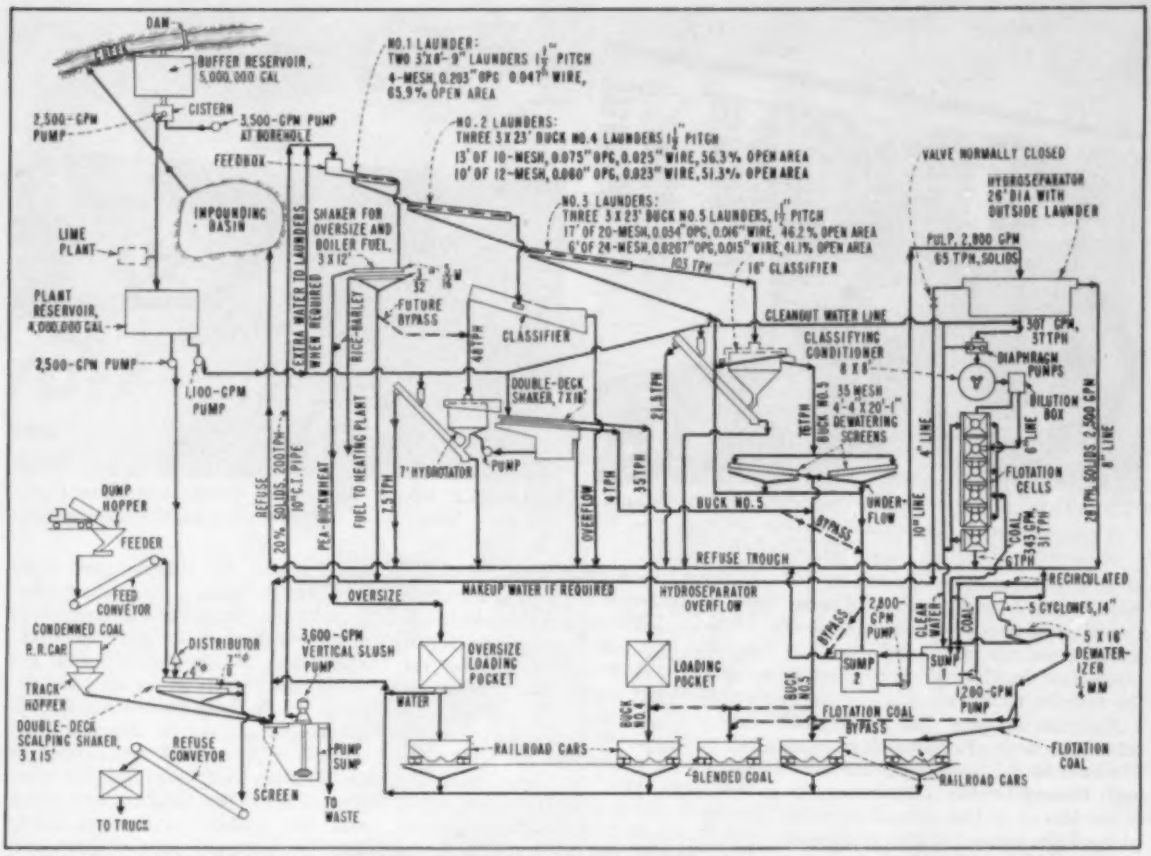


26-FT HYDROSEPARATOR prepares flotation feed to 40% solids to serve 8x8-ft classifying conditioner.

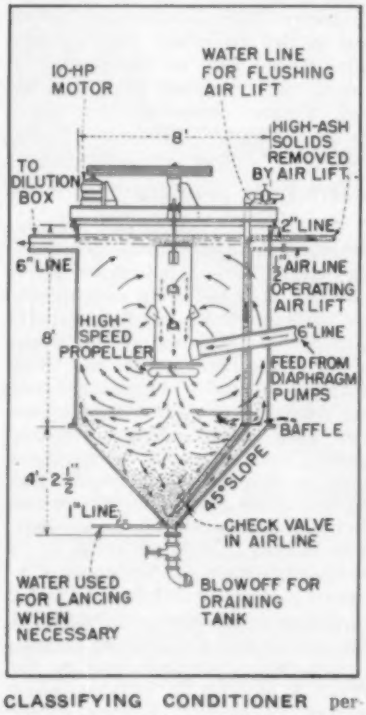
VIBRATING SCREEN receives thickened underflow of cyclones and discharges dewatered flotation coal.



REAGENT FEEDERS dispense 180 cc of fuel oil and 90 cc per minute of pine oil to conditioner and cells.



WELL-PLANNED RECIRCULATION CIRCUITS provide for effective water conservation and plant flexibility.



CLASSIFYING CONDITIONER permits airlift ejection of high-ash fines.

10-in cast iron pipe to the feed box at the head of the two 3-ftx8-ft 9-in primary launder screens.

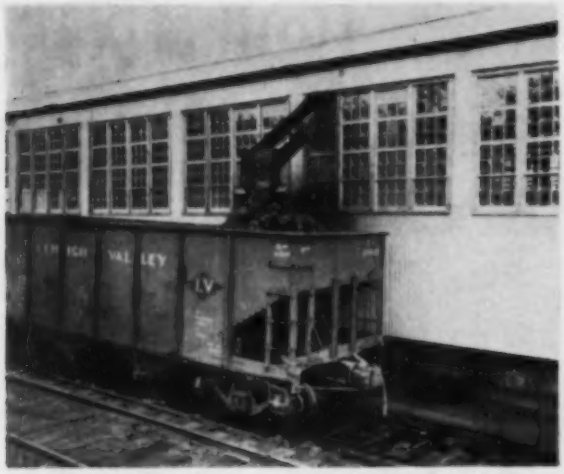
Overflow of the primary launder screens is a plant oversize which is split on a double-deck shaker into a pea-and-buck fraction and a rice-and-barley fraction. The pea and buck is loaded from a storage bin for transfer to Jeddo-Highland's No. 7 plant for full cleaning, and the rice and barley split may either be loaded for shipment to No. 7 or used as fuel for heating the fine-coal plant. A Spencer steel boiler with Losch conversion grates has been installed to take care of the heating load in the plant.

The underflow of the primary launder passes to three 3x23-ft launder screens to isolate the Buckwheat No. 4 feed for the 7-ft Wilmot hydrotator The No. 4 feed is deslimed and dewatered before cleaning in a 60-in by 27-ft 9-in triple-spiral Wemco classifier. Underflow of the secondary launders is fed to a final set of three 3x23-ft launders which overflows Buckwheat No. 5 feed for the 16-ft Wilmot classifier. The underflow of the final launders is dropped into the feed sump of the flotation circuit along with the underflow from the classifier-product dewatering screens.

Flotation feed is pumped by an 8-in, 2,800-gpm Hazleton Type CB volute pump through a 10-in line to a 26-ft Dorr hydroseparator, which overflows minus 200-M fines to waste. In emergencies, however, some of this overflow may be returned to the plant-feed sump as makeup water.

The underflow of the hydroseparator (40% solids) is pumped by a Dorrco 8-W duplex diaphragm pump into an 8x8-ft Denver-Turrall classifying conditioner. This conditioner is equipped with a conical section at the bottom and a baffle plate, as shown in the illustration, to provide an effective separation of high-ash impurities and to concentrate them at the bottom of the cone. An airlift is employed to remove this high-ash material before it can build up to the point of showing up in the feed to the cells. The airlift is operated about 20 min per hour to effectively remove the high-ash fines from the system. Air for the airlift is furnished at a pressure of 10 psi.

The flotation feed overflows from the conditioner through two 6-in pipes into a dilution box where it is diluted



FLOTATION COAL is loaded through a double-discharge chute for better topping and reduced windage loss.

BOREHOLE PUMP and cistern pump (foreground) provide plant water from 175-million-gal underground supply.

to 20% solids and distributed to the Nos. 1 and 2 cells. Clean coal is removed from the first five cells, final refuse from the sixth, and the float product of the sixth cell is returned to the first for recleaning.

Flotation reagents are No. 2 fuel oil and Hercules Yarmor 350 pine oil. Clarkson Model E wet reagent feeders and Denver-Lewers distributor dispense 120 cc of fuel oil and 50 cc of pine oil per minute to the conditioner and 60 cc of fuel oil and 40 cc of pine oil per minute to the cells. Over-all consumption averages 20 gal of fuel oil and 10.5 gal of pine oil per shift. Retention time in the conditioner is 8 min, and air for frothing is supplied in the cells at a pressure of 12-13 oz by a Lamson blower. Large storage tanks for the fuel and pine oils are located east of the plant.

The oils flow by gravity to two 1¼-in Fairbanks-Morse rotary pumps and are pumped to reagent storage tanks placed to feed by gravity to the wet reagent feeders.

Flotation coal is directed from the cells into a sump, where it is picked up by a 6-in, 1,200-gpm Hazleton A-Type CT volute pump and distributed through a manifold to five 14-in Heyl & Patterson cyclones for initial dewatering. Underflow of the cyclones is further dewatered on a 5x16-ft Allis-Chalmers Low Head dewaterizer dressed with ¼-mm Bixby-Zimmer stainless panel surface. Final dewatering takes place in the loaded cars.

Tonnages moving in these circuits are shown in the plant diagram.

SUPPLYING ADEQUATE WATER

The main water-supply reservoir contains an estimated 175-200 million gal in a worked-out deep mine which is tapped by a 20-in borehole 220 ft deep. The borehole pump is a 3-stage, 16-M.C., 2,500-gpm Fairbanks-Morse turbine unit, discharging into a concrete cistern built into a buffer reservoir. Water is pumped from the cistern at the buffer reservoir to the plant reservoir, 4,000 ft through a 12-in wood pipe line, by a 10-in, 2,500-gpm Hazleton Type VS pump. Both the borehole pump and the cistern pump are driven by 2,300-v, 200-hp motors at 1,750 rpm and rated at 225-ft total dynamic head. The buffer reservoir has a capacity of 5,000,000 gal, and the plant reservoir 4,000,000 gal. Clarified water from the refuse and waste impounding area can be returned to the buffer reservoir.

Two pumps for supplying clean water to the plant are installed on the ground floor inside the main building and are supplied with water by gravity from the plant reservoir. An 8-in, 2,500-gpm Hazleton Type CB pump discharges to the main scalping shakers for dilution of the feed to the plant. Underflow of these scalping shakers enters the plant coal-feed pump sump. Any overflow from the main-feed pump sump, and any additional drainage from the loaded cars standing between the loading areas and the loaded railroad-car scale are diverted to an impounding basin near the plant. The solids and water are returned to the main-feed sump by a 4-in Hazleton sand pump. A 6-in, 1,100-gpm Hazleton Type BS unit provides fresh water as needed for screen sprays, refuse float chambers on the cleaning units and for cleaning out the diaphragm pumps, conditioner and so on.

All possible steps have been taken to close the circuit as a hedge against the possibility of long dry spells reducing the primary underground water supply to the point of preventing operation of the plant. For example, some of the overflow of the 26-ft hydroseparator may be diverted from the hydroseparator overflow launder and returned to the main-feed sump, the cyclone effluent may be diverted from the refuse flume and recirculated to the flotation-feed sump and the overflow of both the flotation-feed sump and the hydroseparator-feed sump may be returned to the plant-feed sump.

Furthermore, the surfaces under the loading tracks and plant are paved and graded to return the drainage from loaded cars to the plant-feed sump, and a network of 2-in pipes with firehose connections has been installed to permit these areas to be washed down to recover solids.

MANPOWER AND SERVICES

William Fichter is outside superintendent at Jeddo-Highland operations, and Vincent Garvey is foreman at the new fine-coal plant. Four men operate all equipment inside the plant and one man is in attendance at the dump hopper. In addition, there are three car handlers and a weighmaster-coal inspector. The plant now operates one shift a day. The combined weighing station and laboratory is equipped with a Fairbanks-Morse scale and equipment for determining size consist and ash content in the loaded cars. Cars of coal that do not come up to Jeddo-Highland standards are returned to the plant and dumped into a track hopper to permit recirculation of the coal through the cleaning process.

The total connected load in the plant is 690 hp in forty-six 440-v motors, all General Electric except those integral with other machines.

a page out of the cost book

Drilled 12,000 feet. Forty regrinds. Coshocton County, Ohio. (D-1⅞" Bit.)
37 regrinds, 37 drilling shifts. Pittsburgh 8 Seam, Monongalia County, W. Va. (D-2" Bit.)
5,128 feet of slate. 5,128 feet of coal. Pocahontas Seam, McDowell County, W. Va. (D-1⅞" Bit.)
Drilled 54,000 feet in Pittsburgh 8 Seam. Forty regrinds. (D-1¾" Bit.)
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FOREMEN'S FORUM

A FAIR RETURN on coal's big investment in mining machines and cleaning facilities can be realized only through scientific supervision. Such supervision is just as important as the scientific design which produces machines and plants.

Supervision Is a Science

According to Webster's International, science is defined as a method of functioning which reconciles practical ends with scientific laws. Here's how supervision merits its rating as a science.

GOOD SUPERVISION is somewhat like an iceberg. Only about 10% of either is visible, but how important that submerged 90% is! In other words, giving orders and acting like a boss is only a small part of a supervisor's job. The larger scope of the job includes the unnoticed hours and effort invested in planning, thinking and co-ordinating.

We think it is in these invisible facets of the job that supervision becomes truly scientific. Why do we think this?

Well, in the heading above you see one of the definitions of the word science from the second edition of Webster's International dictionary. To repeat, science is a method of functioning which reconciles practical ends with scientific laws.

The scientific laws which we think apply in this instance are:

$$I = O + L, \text{ and}$$

$$E = \frac{O}{I}$$

where I is input; O is output; L is losses and E is efficiency.

The first law above harks back to the article entitled "Pressure and Resistance," which appeared here last January. It says

---

Take two ounces of plain old-fashioned work,

Add one ounce of confidence,

Flavor well all through with common sense,

Color with a tincture of dreams of greater and better things,

Eliminate all waste and worry,

Speak according to knowledge, act according to conscience,

Mix well and take morning, noon and night the year round.

—Bell & Zoller Safetygram

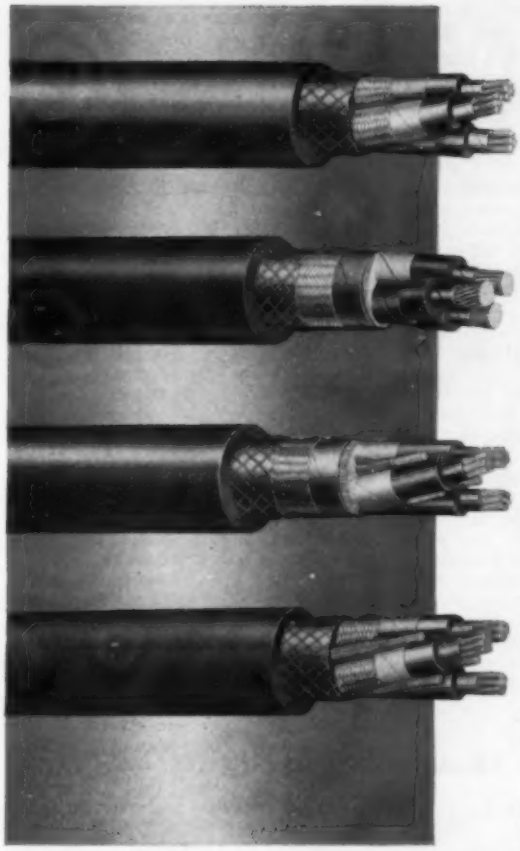
that some portion of all the effort you expend in your work is used up in merely balancing the losses which are as unavoidable as death and taxes. Only the surplus of input over losses shows up as desirable output.

In the second law, the principle explained is that efficiency is a comparison of output to input, nothing more nor less. The big factor in both laws, as you well know, is output. You've heard about it countless times. The constant demand is for more output. So let's examine this business in the hope of finding reasonable ways to increase output.

We shall have to attack the problem successively from two directions, making a starting assumption in each instance. In the first attack we shall assume your input is constant, and in the second that your input increases, without undue strain.

If input is constant, then the only possible way to increase output is by reduc-

Avoid costly "Downtime" with U. S. Royal Shielded Trailing Cables



U. S. Royal SH-A Cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S Uskorona-1 oil base compound, and covered with colored tapes and a braided coated copper shield. The conductors are then cabled and covered with a reinforced jacket of 60% black neoprene. The shielded braid over each insulated conductor eliminates corona cutting by static discharge through equalization of surface stresses.

SH-B cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S. Uskorona-1 oil base compound plus colored tapes. Conductors are then cabled with jute fillers, covered with a rubber-filled tape, a braided coated copper shield and reinforced 60% black neoprene jacket. The shielding braid protects the men handling the cable in the event of fault currents.

SH-C cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S. Uskorona-1 oil base compound and covered with a colored tape. The conductors are cabled with jute fillers and with the specified fabric-covered ground wires in the conductor interstices; then covered with a rubber-filled tape, braided coated copper shield and a reinforced 60% black neoprene jacket. This allows grounding of equipment and provides an adequate low-resistance path for short circuits, thus insuring circuit breaker operation. The grounded equipment provides protection to workmen under fault conditions.

SH-D cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S. Uskorona-1 oil base compound and covered with a colored tape and a braided coated copper shield. The conductors, together with fabric-covered grounding conductors, are cabled and covered with a reinforced black 60% neoprene jacket. The conductor shielding, when properly grounded, equalizes surface stresses and draws off all capacity charging currents, insuring safety in handling. An adequate low-resistance ground for the equipment is provided by the grounding conductors.

All shields and grounding conductors, when used, should be properly and thoroughly grounded.

The constant dragging, flexing, twisting and bruising encountered in heavy service will not bother U. S. Royal Shielded Cables. You'll find that U. S. Royal never runs you into "downtime"—it's the most dependable, efficient cable you've ever used.

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Send for illustrated booklet on U. S. Electrical Wires and Cables for the coal mining industry.

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ing losses to the bare minimum.

Input in this instance consists of a certain amount of purchased labor, a certain amount of electrical energy, a fixed amount of chemical energy in explosives perhaps, a certain amount of timber or roof-bolting materials and so on. On top of these, your input will include an unvarying amount of supervisory talent and worker skills.

The problem of raising output under these conditions becomes one of reducing waste. Wasted time, wasted energy, wasted supplies and wasted motion are big contributors to your total losses. Eliminate waste and you naturally reduce losses, thus increasing output with no added input.

For example, an upset mining cycle, wherein machine-tramming time is excessive and operating time is depressed, is wasteful of electrical energy. Getting the cycle back into its proper tempo eliminates this waste of energy even though no increase in tonnage results, which we agree is difficult to imagine.

Or perhaps closer adherence to the established design of drilling rounds may result in savings in explosives. Better scheduling of man-trips may lead to further reductions in wasteful travel time. Better cable handling may eliminate the lost time and motion used in making unnecessary splices. The simple step of providing protection for the threads or expansion shells of roof bolts will eliminate bolt rejections, resulting in real dollar savings.

Your company is in the business of producing and selling solid energy. Of course you need to invest other forms of energy or the products made by energy in order to get the production job done. But if you use too much of these other forms or products of energy, there will be little surplus of solid energy to sell.

Therefore, eliminating waste is one way to increase output, and examining the second law above, we see that a reduction in losses results in a rise in output at constant input which in turn results in an increase in efficiency.

But few supervisors are satisfied to ride along at constant input. They rightly fear that an attempt to do so would result in noticeable fading in their performance.

Happily, output also can be increased by increasing input, if this added input is well planned. (If the increased input is merely sound and fury, the losses might also increase out of all proportion.)

The added input we mean is that which comes from professional growth. This growth follows after the supervisor has mastered the workaday details of his job and finds himself with more time and freedom for making critical analyses of all phases of his work.

Profitable increases in input may be generated as follows:

1. The supervisor may widen his fund of knowledge to include a practical acquaintance with electrical, mechanical and hydraulic maintenance, for example.

2. He may investigate the conditions and methods of operation prevailing at other mines in search of good ideas applicable to his own mine or section. The tested experience of others is an excellent source of added input.

3. He may study his operations in order to determine whether added input, in the form of new machines, more power or even increased manpower, will pay off in higher output with controlled losses.

The best solution, then, to the problem of increasing output is to place a firm restraint on wasteful losses while developing and applying increased supervisory skills at the same time.

We are fully aware of the hazards of drawing analogies too far. Men are not mathematical robots operating in dull obedience to rigid formulas. But our alibi here is that mathematics is a philosophy, and a philosophy may be defined as a practical, ethical view of life. Therefore, we shall endeavor to make one other point using a mathematical illustration.

You are familiar with Ohm's Law, E=IR, which states that proper pressure will promote desired action in spite of resistance. But modern industry is not a simple DC circuit. It is, rather, a polyphase AC system, so to speak, thus introducing a complication which we describe as power factor.

In a polyphase AC system, a phenomenon known as impedance has the sometimes unhappy faculty of knocking voltage and current out of step with each other. This displacement is most easily explained in angular terms, with the angle of displacement being described as the phase angle. You've heard that term.

From your study of trigonometry you may recall a ratio called the cosine (one of six possible relationships among the sides of a right triangle). The cosine varies between the limits of zero and unity, the cosine of an angle of 0 deg being 1 and the cosine of an angle of 90 deg being 0. In other words, the bigger the angle the smaller the cosine.

It happens that power factor is the cosine of the phase angle, so that in AC terms Ohm's Law must be modified to read E=IRcosA, in which A is the phase angle.

The upshot is that a supervisor's efforts, or his voltage E, must be in phase with his goals, the desirable current I. His power factor will be unity and he will not be penalized.

On the other hand, if the supervisor wastes his own time and effort in futile attempts to boost output by brute force, he will find his efforts and results completely out of step. His phase angle increases. His power factor droops, and poor power factor draws a penalty.

We are not quite certain whether our own attitude in writing this was tongue-in-cheek or heart-in-throat, but we are dead certain of this:

Good supervision is a science because it is based upon fundamental principles, it is amenable to a high degree of systemization and it is a profession worthy of continuous study and progressive development.

Getting Ahead in the World

HOW THEY BEGAN is the heading of a note in the August issue of the HANNA COAL NEWS. The item reads as follows:

"Survey of 1,000 successful men—not just money makers but men who made the world better by their work—showed that 300 started life as farmers' sons, 200 sold or carried newspapers, 200 started as messenger boys, 100 started in factories, 100 as printers' apprentices and 50 began at the bottom in railroad work. Only 50 out of the 1,000 had well-to-do parents to give them a start."

In the same vein, we recently received a letter from Harry Northover, Washington, Pa., telling of similar achievement by R. L. Engle, recently retired mine foreman at Vesta No. 4 mine, Jones & Laughlin Steel Corp.

Mr. Engle was born in Kentucky and attended grade school there. His mother died when he was 11 and his father passed away 7 yr later. Mr. Engle left school and went to work at the age of 14 as a clerk in his grandfather's store. He later worked in a paper mill and as a teamster and then found a job in Tennessee as a greaser and dumper at a coal tipple. With that start he worked his way through the ranks to his position as general mine foreman at Vesta, where the staff included 72 assistant foremen and eight firebosses. Daily production was 10,000 tons and employees totaled 1,200 men. That's big responsibility for a man who had no high school education. But Mr. Engle completed the coal mining course offered by Penn State's Mineral Industries Extension Services and took advantage of other training offers. Mr. Engle's story illustrates the point that success comes from staying with the job of making progress and never settling for the status quo.

Time to Think About Mine Dryness . . .

Now is the time to be doubly certain that rock-dusting and other dust-control measures are up to snuff. Colder weather is here, which means that progressively dryer conditions will prevail in the mines. Inspect your methods and equipment for rock-dusting, take a good look at machine sprays to make sure they are operating properly and inspect your spray water distribution system.

40

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Look over the list of 40 patterns in Jenkins' complete line of Bronze Gates. You'll find the valve you need in this new folder, with details of the *extra value* design and construction that makes Jenkins the best buy for any service. Get this folder, use it to plan your hookups for lasting valve economy.

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OPERATING IDEAS

BIG TRACTOR-TRAILER UNIT chugs slowly through "Baker's Showerbath" as J. A. Caskey (left), night foreman, and Erwin Baker, superintendent at Tiger mine and showerbath inventor, stand by.

"Baker's Showerbath" . . . For Speedy Cleaning of Large Haulage Units

NOW TAKE A LOOK at "Baker's Showerbath."

In name, it's not unlike "Stapleton's Bathtub" (*Coal Age*, March, 1954, p 190). But there the resemblance ends.

"Stapleton's Bathtub" is a 12-man jeep, so designed that men traveling underground in low coal may ride to and from their working places in cushioned comfort, lying back as if in a bathtub.

"Baker's Showerbath" looks like—and really is—a showerbath. For trucks, that is. It keeps mud and dust washed off the big tractor-trailer units that haul coal from pit to preparation plant at the Tiger mine, Hume-Sinclair Coal Mining Co., Hume, Mo.

Idea man and inventor behind "Baker's Showerbath" is Erwin Baker, Tiger superintendent. Roy Houck, Tiger's master mechanic, supervised construction.

A 14-ft-square frame of 4-in ID diameter steel pipe, with elbows at the four corners, is the basic component of "Baker's Showerbath." The frame stands vertical, braced by channel irons, as shown in the accompanying photograph. At intervals, along the inside of all four sides of the square frame, are welded 8-in nozzles made of 1-in pipe flattened at the ejection end to a 1½ x ⅜-in slot. Each vertical side of the frame has 12 nozzles, turned at various small angles to direct the flat sprays of water all over the truck and trailer sides and the wheels. The bottom side of the frame, at ground level, has five nozzles, so set that they spray water over all parts of the undercarriage and the insides of the wheels. The top side has 15 nozzles, all but three of which have been deliberately plugged, this latter number having been found adequate to clean the hood, the top of the cab and the inside of the trailer.

Water reaches "Baker's Showerbath" through a 5-in flexible hose from the nearby preparation plant. Pressure at the pump, which also serves the preparation plant, is 450 ft of head but there is some loss of pressure at the nozzle because of the ¾-mi distance from pump to plant.

Coarse limestone rock is strewn and packed beneath the shower to drain off water and eliminate mud. Water drains into a ditch between the shower and the cleaning plant.

Tractor-trailer units are driven through the bath in a series of starts, about 15 min being needed for a thorough job of cleaning. Except in very wet or very dry weather, one or two baths per week are enough to keep the haulage units clean.

"Baker's Showerbath" hasn't been in use very long, and one or two "bugs" still remain to be eliminated. For example, screw-in nozzles soon will be substituted for the welded-on nozzles, thus making it easy to remove and clean clogged nozzles.

Even so, in spite of a "bug" or two, with dust and mud cleaned off, haulage units look better, inspection and maintenance are easier and rust and abrasion are minimized.

How to Get Longer Life Out of Cleaning-Plant Light Bulbs

"EVER SINCE we installed coal-preparation equipment in our tipple we had a very high mortality rate on 100-w light bulbs," writes Joseph D. Frasca, electrician, No. 3 Coal Corp., South Wilmington, Ill., in describing how the bulbs were installed in porcelain receptacles mounted directly on structural members of the plant. The short bulb life was a result of the vibrations attributed to the new equipment, such as shakers, crushers and conveyors. In some instances, three bulbs per week in each socket were used.

Wherever possible, Mr. Frasca says, the porcelain receptacle was replaced by using a spider cover on the outlet box to hold a short dropline with a brass lamp socket at the end. The new arrangement results in much less vibration at the bulb, consequently the bulbs have considerably longer life and frequent replacement no longer is a problem.

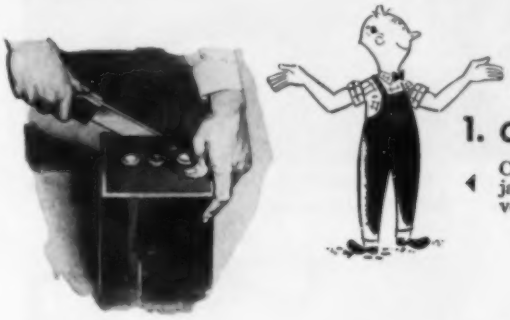
In locations where headroom prevents the use of droplines, Mr. Frasca reports that double sockets in the form of a Y are used with two 50-w bulbs in place of the single 100-w bulb. The sturdier filaments of the 50-w units stand up much better under the vibrations.

BATTERY MAINTENANCE TIP #2

from the GOULD Plus-Performance Plan

BEST WAY TO REMOVE ELEMENT FROM JAR

When accidental damage requires installing an element in a new jar, the element complete with cover must be removed. The Gould Plus-Performance Plan shows you how this can be accomplished easily and with safety.



1. *Cut Bond Between Cover and Jar*

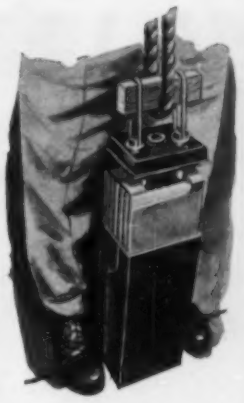
Cut the compound from around the top of jar, using warm compound knife, keeping it very close to inside of jar wall.

2. *Heat Outside of Jar Before Pulling*

To make sure there is no hardened compound to restrain the pulling of the element, heat the outside top of all four sides of the jar with a blow torch. Warm thoroughly, but do not melt or burn the jar.

3. *Pull Element from Jar*

Using Gould Jar Hold Down Clips (Part No. 2-1445) and Gould Cell Puller (Part No. 77061) as shown here, lift element halfway out of jar. Allow element to drain for minute or two, then remove and place immediately in new jar or lay it on flat insulated surface such as wood, for servicing.



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For Railroad Air Conditioning and Lighting | For Mine Shuttle Cars and Locomotives | For Electric Industrial Trucks | For Diesel Locomotive Starting | For Standby and Emergency Power

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Here is one more example of how the Gould Plus-Performance Plan can help you save money by performing many service operations in your own shop. For the complete Plan, mail the coupon TODAY.

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(type or types)

Name _____

Firm _____

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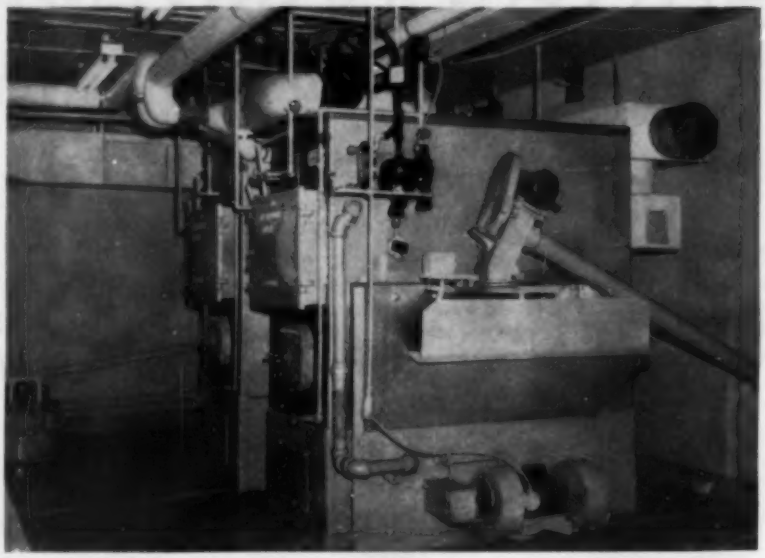
Coal Company's Building Features Automatic Heat

A FULLY AUTOMATIC anthracite heating plant, including vacuumatic ash removal, is operating successfully in the large office building of the Philadelphia & Reading Coal & Iron Co., Pottsville, Pa.

The two large Fitzgibbons boilers used are fired by bin-fed Losch conversion stokers. Ashes from each boiler drop into a chute which funnels them into a box, set at floor level between the boilers.

Two rods, from which extend steel fingers, move back and forth in the collecting box to break up any clinkers. The ash then drops into a grinding mill, where it is pulverized, and is drawn off into the pneumatic system carrying it through steel pipes to a large outside tank attached to the west wall of the office building. When the tank is filled, the ashes are emptied through a pipe into a waiting truck.

The installation handles the heat requirements of the building through thermostatic zone control and also provides hot water. It was designed by the company's mechanical engineering department, and installed by S. P. Miller & Son, of Tremont.



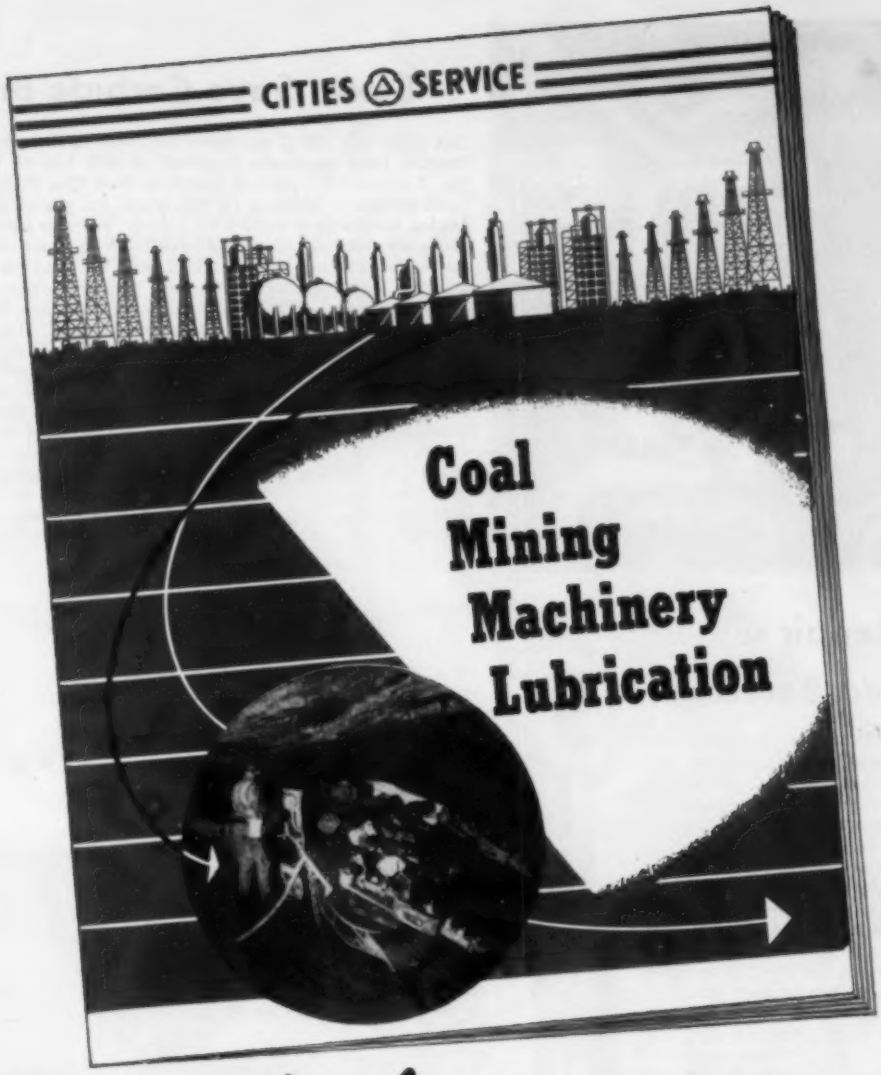
P&R BUILDING now has fully automatic heat, with twin boilers fired by conversion stokers. Coal is fed from bin behind wall at rear of boilers.

VACUUM ASH REMOVAL—Ashes from both boilers drop into collecting box (left) where clinkers are broken up. After being pulverized, ashes are drawn pneumatically into outside storage tank (right) and periodically emptied into truck.

Post-Mounted Section Circuit Breaker Easily Installed

AN AUTOMATIC company-built reclosing section circuit breaker has eliminated the need for a man going to the breaker to reset it each time an overload occurs at Vesta No. 5 mine, Jones & Laughlin Steel Co., Vestaburg, Pa. The new unit consists of a contractor controlled by an electronic tube and can be adjusted to break the circuit at various loads, depending upon the requirement in the section.

When the circuit is opened by an overload, the lights mounted on the lower section of the steel post go on and serve as a feeler-circuit resistance. The feeler circuit automatically attempts to close the circuit and does so when the overload is removed.



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CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Boxes Save Carbide Bits

LONGER BIT LIFE and fewer bit losses in the mine are top benefits from systematic handling of drill bits at the Vesta No. 5 mine of the Jones & Laughlin Steel Co., Vestaburg, Pa. Each section is assigned 12 bits which are placed in a lunch bucket fitted with a wooden bit holder. For easy identification, boxes are painted yellow and have black numbers corresponding to the working sections and shifts. The idea for handling bits this way originated with Matt Blair, superintendent.

At the start of each shift, each section foreman picks up his box, containing 12 sharp bits, at the mantrip station and returns the box at the end of the shift. Thus there is no chance of bits being lost and sharp bits always are on hand on the section. Another advantage of putting the bits in the boxes is that the hard, brittle carbide edges are prevented from bumping against each other and causing chipping and fracturing of the carbide. Bit boxes are taken to the underground supply house by the cager who replaces all dull bits from supply boxes containing 100 bits. Management reports that preventing the bits from receiving sharp blows has contributed significantly to longer bit life.

How to Repair a Damaged Battery

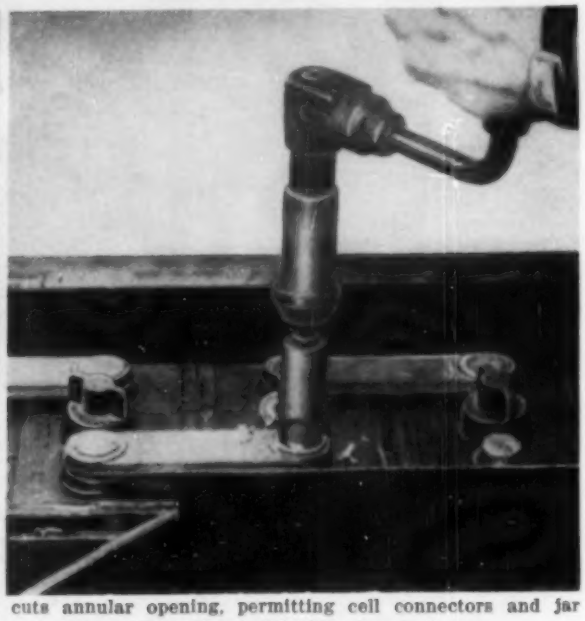
TO EXTEND the life of a shuttle-car or tractor battery accidentally damaged, it often is necessary to remove its cover for cell replacement or element repair. Though simple, the procedure is not too widely understood and, as a result, battery maintenance is sometimes neglected or is more costly than normal. The following helpful suggestions are offered by the service department of Gould-National Batteries, Inc.

To remove a damaged battery cover, it is necessary to cut a gap between lead posts and the lead inserts which are integral with the rubber cover. A special drill (illustrated) has been devised by the Gould-National engineers to cut an annular opening around the posts and permit them to remain solid and of normal size after the cell connector and the jar cover have been separated.

The second technique is to drill the posts in the damaged cover to a depth of ⅜ in, using a 15/16-in drill. This frees the inter-cell connector. Drilling is continued until the cover is freed. This method requires rebuilding the posts before reassembling with a new cover.

When batteries have sufficient clearance between the inter-cell connectors and the top of the cover, the first drilling may be eliminated by a horizontal saw cut under the connector.

Where the cover is not damaged, but cover and elements are to be withdrawn for repair, it is necessary to remove only the inter-cell connector and lift both cover and elements as a unit.



SPECIAL DRILL cuts annular opening, permitting cell connectors and jar covers to be removed without disturbing terminal.

ALTERNATE METHOD of removing damaged cover (left) with 15/16-in drill.

PULLING THE COVER and element simultaneously works when the cover is not damaged.

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THE BOSTON MAN delivers rubber products right now!

Boston Silver King Rotocord Conveyor Belt. 1680 feet long, 26,350 lbs.

The mammoth belt pictured above stood too high on its freight car to pass through many of the railroad tunnels and underpasses en route to its West Virginia destination. Boston Men rolled up their sleeves . . . teamed up with railroad freight traffic experts . . . pored over maps and timetables. As a result, the giant was rerouted many miles, but it wasn't late for its installation.

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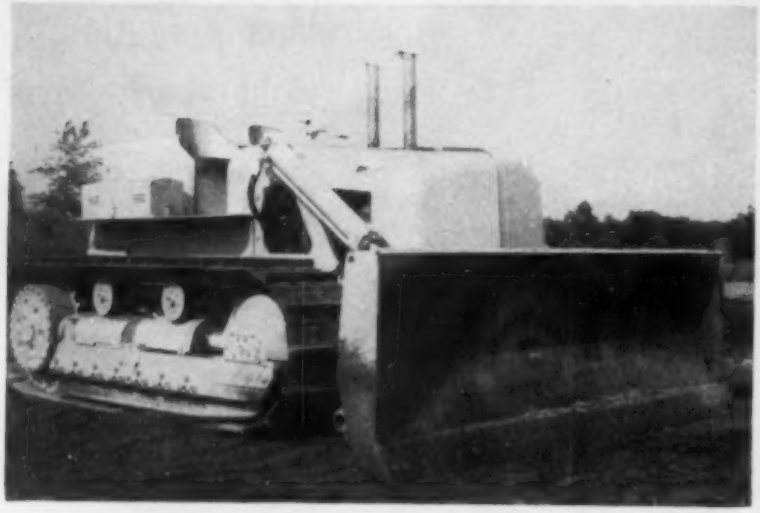
EQUIPMENT NEWS

380-Hp Twin-Engine Unit Leads Off New Crawler-Tractor Line; Three Rubber-Tired Scrapers Introduced (1-2)



The Euclid Div. of General Motors Corp., Cleveland 17, Ohio, recently announced its entry into the crawler-tractor field with a new 380-hp twin-engine machine of revolutionary design resulting from demands for more tractor power and greater earthmoving ability. At the same time, Euclid introduced three new experimental rubber-tired scrapers, one with a struck capacity of 7 cu yd and two of 18-yd capacity.

The first of a projected line of tractors, the new Euclid Model TC-12 Twin Crawler is said by the company to offer twice the power of any similar equipment now available. It is powered by two 190-hp 6-cylinder GM diesel engines, each driving an Allison torque converter and Allison Torqmatic transmission. Each drive train independently powers one track, and the two separate drive and track assemblies are free to oscillate on a 7-in transverse shaft. The two-section design also gives flexibility on uneven ground and good traction is obtained because each half maintains better ground contact. Use of the twin-power principle gives lower cost per yard moved, the company points out, because it takes advantage of high-volume, lower-cost assemblies used in smaller machines, with favorable parts supply and costs, and it is not necessary to develop a completely new power train for the new larger tractors.

The two Allison transmissions provide three forward and reverse speed ranges, with a top speed of 8 mph, and all shifting is under full power without loss of motion. The twin-power arrangement also permits a fast, flexible steering system that increases workability, it is said. Initially displayed were a push plate for scraper loading, hydraulically controlled 13½-ft bulldozer blade, 17-ft 3-in angle-dozer blade and a pull yoke for a Euclid loader. A full range of additional attachments is being planned.

The three new scrapers include the Model S-7, an overhung engine unit with a 7-cu yd struck capacity; the S-18, an 18-yd overhung machine; and the TS-18, an 18-yd experimental overhung-engine Twin Power scraper. Designed for the small self-propelled scraper field, the S-7 features a 138-hp GM diesel engine, full 90-deg hydraulic steering for non-stop turns on 26 ft, 5-speed transmission, three independently operated hydraulic scraper controls and a 4-section interchangeable reversible cutting edge. The S-18 is powered by a 300-hp GM Series 6-110 engine with an Allison Torqmatic converter and transmission that eliminate clutching and permits shifting under full power at all times. The TS-18 features two 190-hp GM diesel engines, one in the tractor and the other behind the scraper bowl for the rear wheels, driven through Allison Torqmatic converters and transmissions. No-Spin differentials provide better traction for drive wheels on both the S-18 and TS-18.

For full details on the new Euclid twin-engine tractor line, Circle 1 on the postage-free card facing p 124. Circle 2 for data on the three new rubber-tired scrapers.

"LOW-SLUNG"

FOR CLOSE-QUARTER WORK

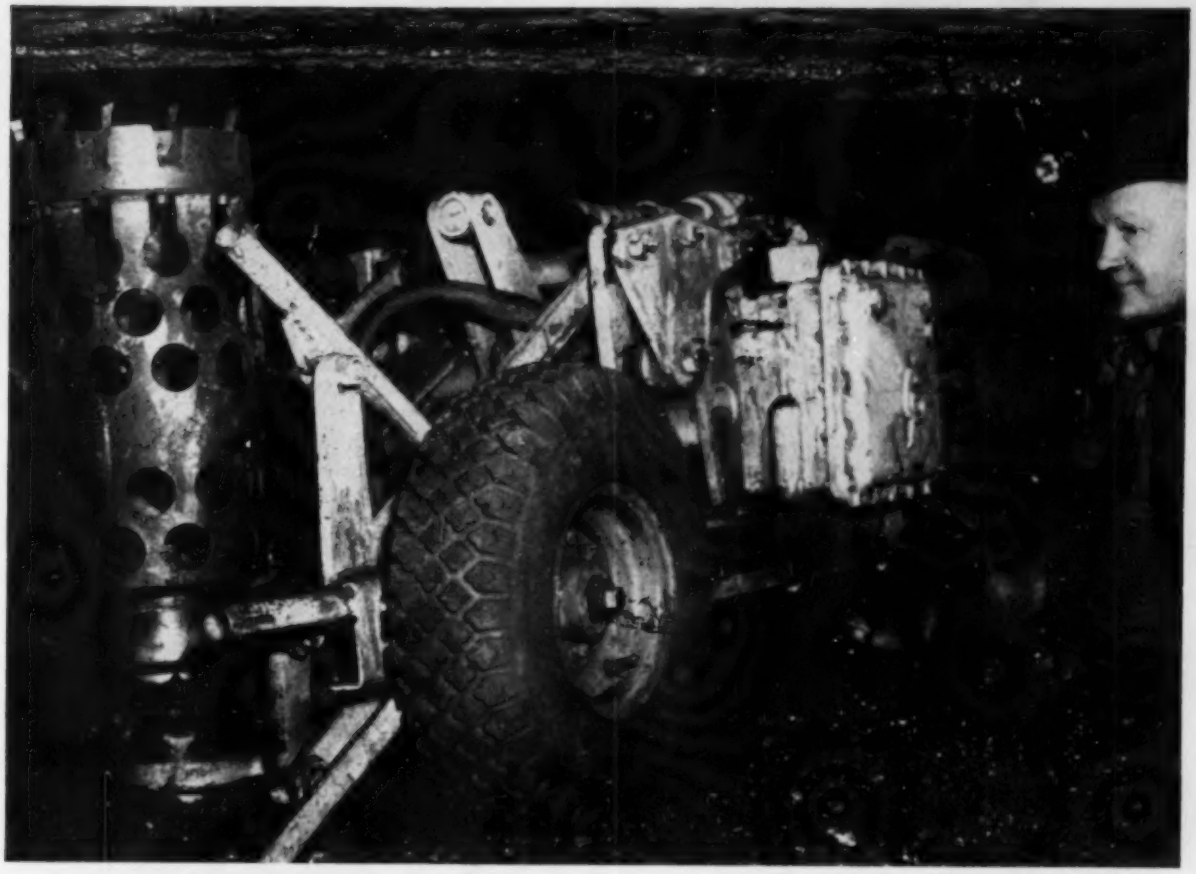


Photo courtesy of Kennametal, Inc.

Here's proof of the RBD-30's ability to work in low seams. This unit was equipped with a 9¼" hitch bit to drill away a 20" core of bony.

Photo Courtesy of Kennametal, Inc.

Then without repositioning, the RBD-30 drilled a 42" bolt hole inside the hitch hole and set the expansion bolt in the solid roof.

The compact Chicago Pneumatic RBD-30 Mobile Roof Bolting Unit's 28" over-all height makes it ideal for operating in low coal seams. And it's equally as efficient in high seams as well! You can complete an entire cycle, from drilling hole to setting expansion bolt without repositioning, in 3 minutes flat. And where hole depth is less than 36", installation can be made in 1½ minutes!

One rugged motor drives both auger and bolt setter — a telescopic chuck permits 10" auger adjustment to quickly conform to roof irregularities. Slip clutches prevent feed motor from stalling and protect drill and nut setting motor. *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, New York.*

Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

New Unit Speeds Float-Sink Testing (3)

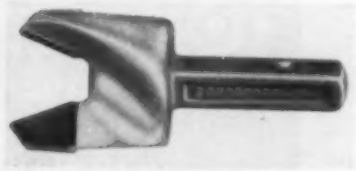
The new Holmes float-sink testing machine offers varied features to make testing quick and easy and thus facilitate proper adjustment of preparation equipment for peak performance, close quality control and minimum losses. Among the features cited by the maker are: one-man operation with much less labor than the scoop-and-bucket method; scale made part of unit to save steps and ties; all controls within easy reach; higher accuracy by use of ample sample; and greater uniformity of results because of mechanized handling and weighing. A 1-cu yd sample can be tested in a few minutes and fine material can be included by use of a fine-mesh wire cloth in sample baskets, it is said. With the tank divided into two compartments, the unit can be used in two ways: testing in one side while using the other as a drain and rinsing compartment; and testing with liquids of different specific gravities in each compartment. Bulletin 106 with full design and operating details, Robert Holmes & Bro., Inc., Danville, Ill.

Portable 4-in-1 Power Unit Is "Jack of All Trades" (4)

Newly developed "Power-Slave" provides a single engine and four interchangeable basic units, generator, pump, air compressor and spray setup, all mounted on a highly mobile ball-bearing swiveling tricycle. Basic units can be switched in less than 60 sec without tools, the maker says, and thus can handle more than 24 different jobs such as powering a chain saw, drill, planer, sander, pump for dewatering or fire fighting, inflating tires, paint spraying, etc. The Power-Slave is available in two models, Model 60 powered by a 6-hp engine and Model 25 equipped with a 2½-hp engine, with equipment sized to fit. The Model 60 generator develops 2,500 w of 115 v AC and will operate two power tools simultaneously, it is said. The self-priming pump included as part of the basic equipment handles up to 1,500 gph, while the twin-cylinder compressor develops up to 150 psi. Bulletin with details from Master Mechanic, Inc., Burlington, Wis.

Complete Drill Jumbo Mounts on Tractor (5)

A completely self-contained mobile drilling unit reported by the maker to be highly efficient consists of Gardner-Denver rock drills on long-feed mountings, G-D hydraulic booms and a complete G-D air compressor for powering the drills, all mounted on a Caterpillar D-8 tractor. Gardner-Denver compressor assemblies are available in capacities of 600, 500, 385 and 315 cfm for direct connection to the rear power take-off of D-8 tractors. Hydraulic booms available in various lengths and a choice of several drill sizes and types of feed mountings permit tailoring the tractor-mounted jumbo unit to individual job requirements. Remote controls for one-man operation of all drilling and positioning from a central station on the tractor also are available. Full specifications from Gardner-Denver Co., Quincy, Ill., by circling No. 5 on postage-free card.



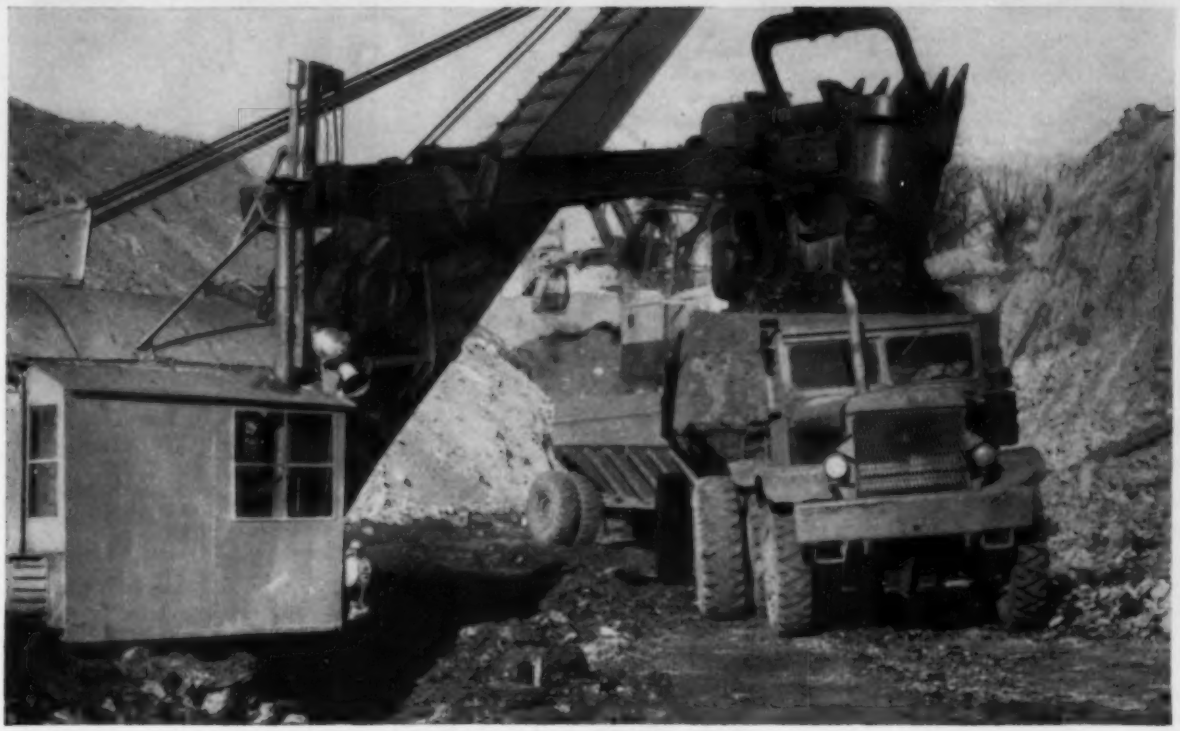
FASTER DRILL BIT (6)

The new Schroeder BH drill bit for hydraulic handheld coal drills features a new carbide tip to promote faster drilling; a heat-treated forged-steel drill body; greater clearances at the drill head to reduce drag; and reduced area of penetration for ease of feed. BH drill bits are available from stock in 1¾- and 1⅞-in sizes to fit standard ½-in square auger. Schroeder Bros., Pittsburgh 1, Pa.

STRONG FILTER CLOTH (7)

Its CPS (controlled pore size) woven Teflon filter cloth combines for the first time the corrosion and high-temperature resistance of Teflon in a fabric with controlled pore size for filtration, according to the maker, Porous Plastic Filter Co.,

B.F.Goodrich



"We prefer the Universal tread over any other," mine superintendent says

HOUR after hour, Roy J. Ault, superintendent of the Shasta Coal Corporation strip mine at Bicknell, Ind., sees giant tractor-trailers haul 32-ton loads of coal up out of the mine. B. F. Goodrich Universal tires work so well on rock-covered roads that Ault says they are preferred over other makes.

The Universal tread is specially compounded to resist rock cuts and bruises. Wedge-shaped cleats defy dangerous skidding and sliding.

All-Nylon cord body

B. F. Goodrich Universal tires have an *all-nylon* cord body. Nylon is stronger than ordinary cord materials, withstands double the impact. All-nylon Universal tires outwear the tread, *can still be recapped over and over!*

Under the tread is the B. F. Goodrich nylon shock shield. Layers of strong nylon cords stretch together under impact to protect the tire body. Result: Universal tires wear longer; more tires can be recapped.

See all-nylon Universal tires (size 12.00 and larger—smaller sizes in rayon or nylon) at your B. F. Goodrich retailer's. The address is listed under Tires in the Yellow Pages of your phone book. Or write *The B. F. Goodrich Co., Tire & Equipment Division, Akron 18, Ohio.*

Specify B. F. Goodrich tires when ordering new equipment

EN ROUTE TO THE TIPPLE B. F. Goodrich tires "hold the road better", Shasta Coal Corp. reports.

UNIVERSAL TIRES are non-directional, can be mounted in any wheel position. You need fewer spares.

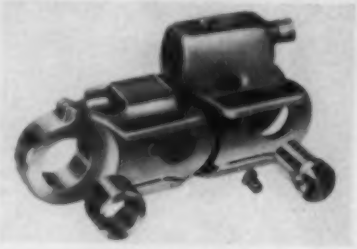
Glen Cove, L. I., N. Y. CPS is woven of du Pont's new Teflon fiber which has a tensile strength 20 times that of solid Teflon, putting it in the same class as nylon and Dacron for strength and flexibility, it is reported. CPS has the lowest coefficient of friction, the greatest water repellency and the least affinity for adhesives of all fibrous materials, and cake removal thus results regardless of the material filtered, the company says. CPS is available in widths up to 44 in two grades, the finer for removal of particles 25 microns and over, and the coarser for removal of particles 40 microns and over. The cloth also will be cut and tailored to order to fit existing filters.

MINERS' HAT EYESHIELD (8)

A new Skullgard eyeshield, designed for convenient cap-mounting on all types of MSA Skullgard protective headgear, has been announced by Mine Safety Appliances Co., Pittsburgh 8. Made of formed plastic, the device deflects flying particles while offering unobstructed vision. The eyeshield is hinged at the peak of the Skullgard so that it will remain firmly in either the up or down positions or can be easily flipped into position when protection is needed. Bulletin 0302-3 with full details from MSA.

DRILL NOW SELF-PROPELLED (9)

Addition of a Cleveland air motor and special axle, to make its Cleveland DR-30 wagon drill self-propelled, provide more flexibility in deep-hole drilling and save setup time, has been announced by Cleveland Rock Drill Div. of Le Roi Co., subsidiary of Westinghouse Air Brake Co., Cleveland 11, Ohio. The Cleveland air motor has a ratio that gives plenty of power for propulsion over rough terrain and a similar air motor also is used for raising and lowering the wagon-drill boom to further speed drilling, the company says. The DR-30 retains all of its features, it is said, including strong rotation and powerful hole-cleaning ability, and a patented air feed with an 8-ft travel for 6-ft steel changes that not only makes drilling faster with both steel and carbide bits but increases footage drilled per bit.



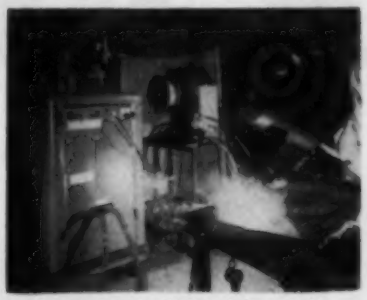
NEW CUTTER CHAIN (10)

A new coal cutter chain designed to accommodate all types of ⅜ x 1-in bits has been announced by the Bowdil Co., Canton, Ohio. It has been made available as a result of requests from operators who desire the performance features of Bowdil's chains but whose conditions prevent a complete changeover to Bowdil bits. The new ⅜ x 1-in bit chain operates in all Bowdil cutter bars, as well as all other makes of bars.

High Valve Unit Injector
Terne Plate Compressible Sealing Ring between Head and Block
Figure-8 Air Intake Ports in Cylinder Liner
Hard Chrome Plated Steel Compression Rings
Higher Compression Piston

IMPROVED DIESEL ENGINE (11)

Recent improvements in the cylinder assembly of General Motors Series 71 diesel engines provide better fuel economy, increased horsepower in some sizes and longer life for the power plants in all types of industrial, construction and earthmoving equipment, the company reports. With others previously announced, the latest improvements complete an entirely new cylinder assembly for the Series 71 engine and include a new cylinder liner which provides a freer flow of air into the cylinder, a new piston which increases the compression ratio, and longer-life compression rings. The new liners and pistons are interchangeable with those formerly used and may be installed on engines now in service as replacements become necessary. The compression rings now used are of hard chrome-plated steel, while another development previously announced was the use of individual terneplant compressible rings to assure long-life trouble-free sealing between the cylinder block and head. Booklet, "The Inside Story," describing the completely new Series 71 cylinder is available from Detroit Diesel Engine Div., Detroit 28, Mich.



LOWER-COST WELDING (12)

Higher welding speeds, better quality welds and lower operating costs are the main advantages of a new consumable-electrode inert-gas arc-welding process developed by Westinghouse Electric Corp., Pittsburgh 30. Field tests disclose a 15 to 20% faster welding speed at a 25 to 50% reduction over other manual and semiautomatic inert-gas methods, the company reports. Key to the process, which uses ordinary welding-grade argon to shield the arc, is a new coated wire—West-ing-arc MS-20 wire—a product of 5 yr of research and development. The wire produces best results when used with a newly designed welding gun, wire control and new constant-potential power source, the RCP 500-amp DC arc welder. Primarily intended for horizontal and flat welding, either semiautomatic or automatic, the process offers all the advantages of consumable-electrode welding, already used for stainless steel, aluminum and other non-ferrous metals, to welding of mild steel from 1/16 in up at economical operating costs. Welds produced can be painted without cleaning and there is virtually no spraying or spatter nor slag covering on the weld.

LONG-RANGE HAILER (13)

The new Audio Hailer, an all-electric self-contained power megaphone, uses electronic amplification to magnify the human voice 1,000 times without distortion and with full intelligibility, the maker says. The unit is completely self-contained and weighs only 5½ lb complete with batteries. More than 5,000 10-sec messages are obtained with a set of batteries, it is said. Audio Equipment Co., Inc., Great Neck, L. I., N. Y.

AC HOIST CONTROL (14)

Its new Bulletin 14166 magnetic AC hoist controller for use with wound-rotor motors in heavy industry combines the

O-B

Shells and Plugs

Whether you use Palnuts or upset ears (as shown here) on your roof bolts, here's why you always get a good job with O-B Standard Expansion Units.

- High grade malleable iron Shells and Plugs are factory coated with No-Ox-Id; you get protection from rust before and after installation, well lubricated threads for easy tightening during installation.
- Pre-expanded shell prongs flex against sides of the bolt hole; you can shove the bolt up easily and it stays put until tightened.
- Four prongs of shell offer plenty of expansion; deeply-cut serrations get a grip in any top to give you maximum installed tension for every pound of torque.
- Assembled units are shipped, 50 to a carton, in husky 26-pound packages that are easy to handle, hard to break open accidently. Units get to the face just as they left the factory.

For use with ¾-inch roof bolts—Order Catalog No. 21889.

Ohio Brass

MANSFIELD OHIO, U. S. A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

Feeder and Trolley Materials • Control Materials • Trolley Shoes
Roof Bolt Shells and Plugs • Rail Bonds • Automatic Couplers

BREAK HEAVY LOADS SAFELY

With O-B Feeder Safety Switches

Look inside this O-B 1500 amp Mine Feeder Safety Switch. See for yourself why you can depend upon it, as so many mine operators do, to interrupt high currents *instantly—safely—repeatedly*—day after day and month after month through long years of service.

Look at the rugged simplicity of design and construction, then at these nine reasons for the added measure of safety it guarantees the men who operate it and the expensive feeder systems it protects.

This is the kind of protection that pays for itself in piece of mind, in security, and ultimately, in fine performance.

1. High conductivity, solid cast bronze terminals hold feeder cable by means of steel set screws—no soldering required.
2. Hard, cold-rolled copper contact jaws maintain strong pressure on switch blade, sustain contact through years of rough usage.
3. Switch blade is heavy section, hard cold-rolled copper burnished to bright finish for smooth action, long life.
4. Powerful magnetic blowout coil on 600 and 1500 amp models extinguishes power arcs instantly, safely.
5. Asbestos buffer plates extend on either side of contact jaws for added safety.
6. Heavy steel operating spring gives quick make and break contact, preventing pitting of jaws or blade.
7. Fire-proof insulated case is bolted through both sides for increased strength.
8. Soft rubber handle affords full two-handed grip for easy throwing.
9. Three-point mounting (sides, bottom) gives rigid, firm support on uneven surface of rib.

Available in 400, 600, and 1500 amp ratings. Clamp type terminals accommodate cable up to 900,000 cir mils for two lower rated switches, up to 1,500,000 cir mils for 1500 amp switch.

400 amp model — Catalog No. 18669 600 amp model — Catalog No. 15975
1500 amp model — Catalog No. 15976

(Insulated case of 1500 amp O-B Mine Feeder Safety Switch has been replaced with transparent plastic to show operating mechanism.)

Ohio Brass

MANSFIELD OHIO, U. S. A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

Feeder and Trolley Materials • Control Materials • Trolley Shoes
Roof Bolt Shells and Plugs • Rail Bonds • Automatic Couplers

Power

from a small package with this NEW O-B RAIL CLAMP

- About as big as the palm of your hand, this new O-B Rail Clamp carries up to 400 amps without overheating—and does it when clamped to rusty scale-covered rail too!
- Only wrench required to do the job is "built-in"—fastened right on the head of the heat-treated steel set screw through which contact is made.
- By means of a swivel action, the high strength bronze handle turns 180 degrees and then flops over to continue tightening.
- Bronze cable connection holds cable sizes from No. 14 to 2/0. Clamp fits on base of any rail up to 100 pounds.

Order Catalog No. 22461.

Ohio Brass

MANSFIELD OHIO, U. S. A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

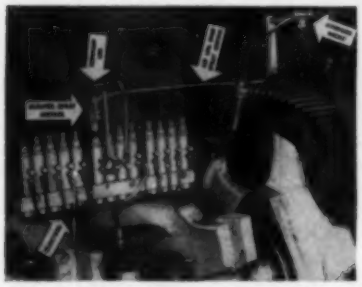
Feeder and Trolley Materials • Control Materials • Trolley Shoes
Roof Bolt Shells and Plugs • Rail Bonds • Automatic Couplers

4496-M

characteristics of the eddy-current load brake and the regulating magnetic amplifier to obtain speed-torque curves previously unavailable on AC hoists, according to Cutler-Hammer, Inc., Milwaukee, Wis. The regulating action provided affords a set of specific lowering speeds virtually unaffected by changes in the hook load, it is said.

CUTS WIRE ROPE (15)

Wire rope of all sizes can be cut quickly and easily without deforming or unraveling the individual wires with a Norton reinforced resinoid wheel, according to the Norton Co., Worcester 6, Mass. Shown on this cutting-off machine is a Norton 16 x 5/32 x 1-in A24-V10BN resinoid Norflex wheel operating at 3,425 rpm, with wheel guard raised to show operation. The strength and safety of this reinforced wheel makes it suited for this rather unusual application, the company points out.

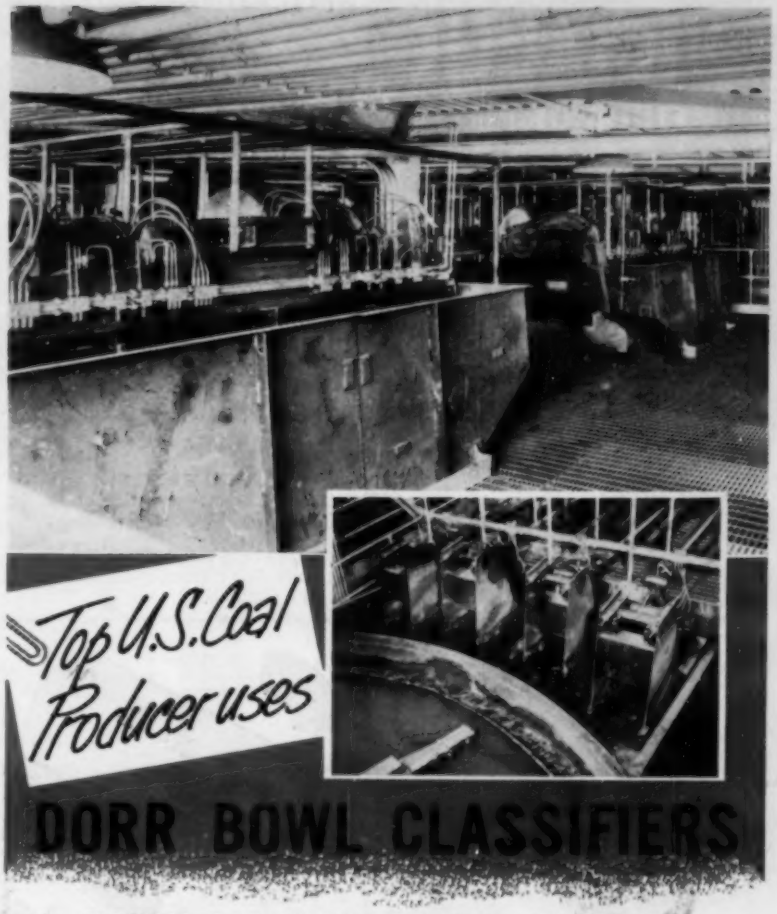


AUTOMATIC GEAR LUBRICATOR (16)

New Lincoln spray-control valve operates automatically in conjunction with centralized lubrication systems to provide controlled-mist lubrication for open gears, with valve assembled to any lubricant injector in the system and mounted either adjacent to or remote from gears to be lubricated. Lubricant output can be increased, as desired, by diverting lubricant from two or more injectors through lubricant line to adjustable spray nozzle. Lincoln Engineering Co., Industrial Div., St. Louis 20, Mo.

HIGH-VOLTAGE STARTER (17)

A new line of Air-Break starters for 2,200-5,000 v squirrel-cage, wound-rotor and synchronous motors has been an-



TOP PHOTO—Operating floor showing rake discharge ends of Classifiers.
BOTTOM PHOTO—Close-up of one machine showing part of bowl and lower rake hangers.

Largest single producer in the nation, the Robena Mine of United States Steel Corporation's Coal Division recently completed additions to their fine coal cleaning plant. Six Dorr Bowl Classifiers with quadruplex rakes and 19′ dia. bowls were installed to deslime and dewater hydroseparator underflow ahead of additional treatment. Rake product from each Classifier is 15 TPH of +325 mesh coal which is upgraded on tables. The addition of this proven metallurgical processing step at Robena has resulted in an appreciably improved concentrate from the table plants which can be dewatered to a lower moisture content than previously and also contains less ash and sulfur.

We'd like to tell you more about how Dorr metallurgical methods are now being used in modern coal preparation plants. Just write for a copy of Bulletin No. 7100 to The Dorr Company, Stamford, Conn. No obligation, of course.

FIFTY YEARS 1904-1954

Better Tools TODAY to meet Tomorrow's demand

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WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

THE DORR COMPANY • ENGINEERS • STAMFORD, CONN.
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VICTAULIC
METHOD OF PIPING

FOR GROOVED PIPE

Style 78
VICTAULIC SNAP-JOINT

New, boltless coupling — hand-locks — for faster hook-ups with no loose parts. Ideal for temporary or permanent lines. Sizes 1", 1¼", 2", 3", 4".

Style 77 & 77-D

VICTAULIC COUPLINGS Style 75

Style 77 & 77-D—The "general-purpose" couplings for standard applications. Simple, fast, reliable—sizes ¾" to 60".

Style 75—Light Weight Couplings—for low pressure, low external stress applications. Sizes 2", 3", 4".

VIC-GROOVER TOOLS

Handy, on-the-job grooving tools that do the work in half the time. Light weight, easy to handle, operate manually or from any power drive. Automatic groove position and depth. Sizes ¾" to 8".

VICTAULIC FULL-FLOW FITTINGS

Streamlined for top efficiency, easy to install—complete line, Elbows, Tees, Reducers, Laterals, etc., — fit all Victaulic Couplings. Sizes ¾" to 12".

FOR PLAIN END PIPE

Style 99
VICTAULIC ROUST-A-BOUT COUPLINGS Best engineered, most useful plain end joint on the market! Simple, fast, husky. Easy to install with any socket wrench. Takes strong, positive, bull-dog grip on pipe. Sizes 2" to 8".

Promptly available from distributor stocks coast-to-coast. Write for NEW Victaulic Catalog and Engineering Manual No. 54-8C.

VICTAULIC
COMPANY OF AMERICA
P. O. Box 509 • Elizabeth, N. J.

EASIEST WAY TO MAKE ENDS MEET!

nounced by The Electric Controller & Mfg. Co., Cleveland 4, Ohio. The starters are built in three styles of 50,000-kva interrupting capacity, with power fuses for systems of 150,000 kva (2,300 v) and 250,000 kva (4,600) availability, and in the "Valimitor" (volt-ampere-limitor) style in which air-core reactors limit infinite kva to a finite value within the rating of the starter.

SECTIONAL BELT CONVEYOR (18)

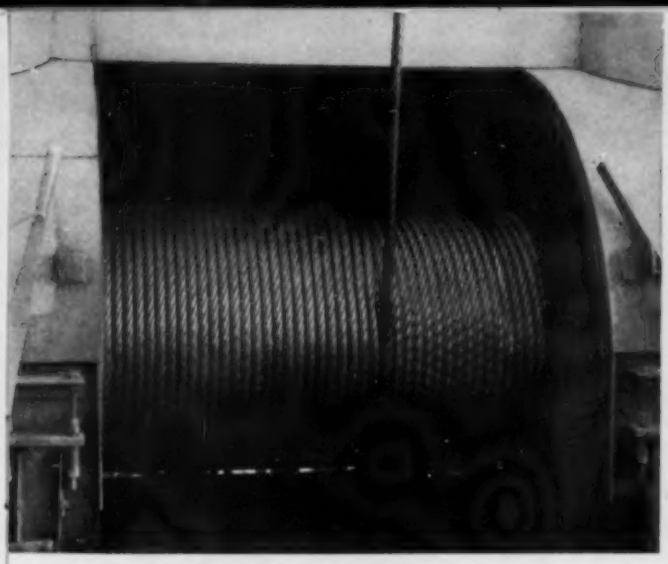
Stephens-Adamson Mfg. Co., Aurora, Ill., offers a complete set of belt-conveyor components pre-engineered for customer assembly and designed for lengths up to 50 ft and from 51 ft through 100 ft in both 18- and 24-in belt widths. Limiting capacity for 18-in belts is 150-tph and for 24-in belts 250 tph. With Saco sectional belt conveyor components users may choose either a Saco speed-reducer drive with overhead motor mounting or a shaft-mounted reducer. All conveyor components are available from stock, as a package unit for a complete conveyor installation or as repair or replacement units on existing conveyors. Bulletin 1454.

PORTABLE DRAFTING OUTFIT (19)

A complete portable drafting system of professional quality for personal use, the Universal Desk-Topper drafting and layout machine consists of a newly designed drafting machine with a drawing capacity of 22 x 34 in, a 9-in and a 15-in engine-divided aluminum-alloy scale, folding board equipped with folding legs and rubber feet that accommodates drawings up to 17 x 22 in, box for instruments, tracing paper dispenser, and a carrying carton or custom-styled travel case. Folder with details from Universal Drafting Machine Corp., Cleveland 2, Ohio.

CYCLONES, RUBBER LINED (20)

The Dorr Co., Stamford, Conn., has announced the redesign of its standard 6-,



OVERCOMING ABRASION—Wire rope takes a beating on some jobs by abrasion. It is squeezed in multiple layers under tremendous pressure on rotary drilling drums in the Texas oil fields. In the Northwest it drags under heavy logs.

In this Arizona mine it is scraped over rocks to operate a slusher. Everywhere it is rubbed severely on winches that do not wind smooth. Under such conditions Red-Strand 6 x 19 Seale wire rope will last longer and save you money.

What can you do better with 6x19 Seale Red-Strand?

6 x 19 Seale

6 x 19 Filler Wire

6 x 19 Seale has the same strength and weight as the more frequently used 6 x 19 Filler Wire, but the arrangement and size of the wires is different. You can see in the diagrams that the outer wires are fewer in number and larger in size. They provide *high resistance to abrasion* and greater wearing quality with somewhat less flexibility.

It's the perfect rope for certain jobs. Would it solve a problem for you? Be less trouble? Save more money? A Leschen man is near you. Perhaps he can help. Leschen is providing *longer-than-expected* wire rope service to industry everywhere.

Send for the 64-page Leschen Wire Rope Handbook. It describes Seale and all other Red-Strand wire rope constructions.

LESCHEN WIRE ROPE DIVISION
The Watson-Stillman Company
(A SUBSIDIARY OF H. K. PORTER COMPANY, INC.)
St. Louis 12, Missouri

LESCHEN
HERCULES Red-Strand
WIRE ROPE

Stands Up To Tons of Tough Abuse

Quaker

MAINLINER CONVEYOR BELT

For strength that withstands shock-impact loads, this belt has what it takes. Rugged duck and nylon construction with skim coat between plies gives it almost *twice the strength* of similar gauge cotton duck belts. Practically stretchless, yet highly flexible for easy troughing. Conforms perfectly to idlers. Available in any length with any number of plies in widths up to 72". For superior service, use the Mainliner—another Quaker quality product to keep production on the move.

Write for free folder and name of nearest distributor.

Belting, Hose, Packing and Moulded Rubber of every construction for every need.

QUAKER RUBBER CORPORATION
DIVISION OF H. K. PORTER COMPANY, INC.
OF PITTSBURGH
PHILADELPHIA 24, PA.
Branches in Principal Cities

12- and 24-in-diameter DorrClones. Known as the Type FR, these wet-classification units now have replaceable molded-rubber inserts. The rubber lining will increase considerably the operating life of sections not previously lined, and rubber replacement sections are extremely easy to install and less costly than equivalent parts used in the old design, the company reports. With the revision in design, all interior surfaces of the unit are protected and wear in these portions is definitely decreased, it states. The new-type DorrClones are available from stock.

LOW-COST CAR PULLER (21)

The Clyde Iron Works, Inc., Duluth 1, Minn., has announced a new low-cost capstan-type car puller. Two sizes are available: Model 5 with 5,000-lb starting line pull and 2,000-lb running line pull; and Model 10 with double those ratings.

NEW-PRINCIPLE WELDER (22)

A new semiautomatic welding machine announced by the Amsco Div. of American Brake Shoe Co., New York 17, is said by the maker to be the first machine to combine the advantages of hand welding and automatic welding, while eliminating most disadvantages encountered with either. The new MF welder feeds bare wire from a coil through a hand-held hopper containing magnetic flux, which clings to the wire as it leaves because of the magnetic field set up by the welding current. Thus the electrode wire reaches the arc with a flux covering that contributes the advantages of a manual electrode coating, including full observation of the work and elimination of the delay of replacing electrodes and the waste of stub ends. By using only one type of wire and changing the flux, various deposits can be made. Available in portable and cabinet models, the new MF machine does not obsolete basic welding equipment. It is easily connected to any conventional AC or DC welding machine operating over a range of 150 to 500 amp.

NEW 5,000-V POWER CABLE (23)

A new type of non-metallic sheathed cable designed especially for 5,000-v power feeder service has been announced by the Rome Cable Corp., Rome, N. Y.

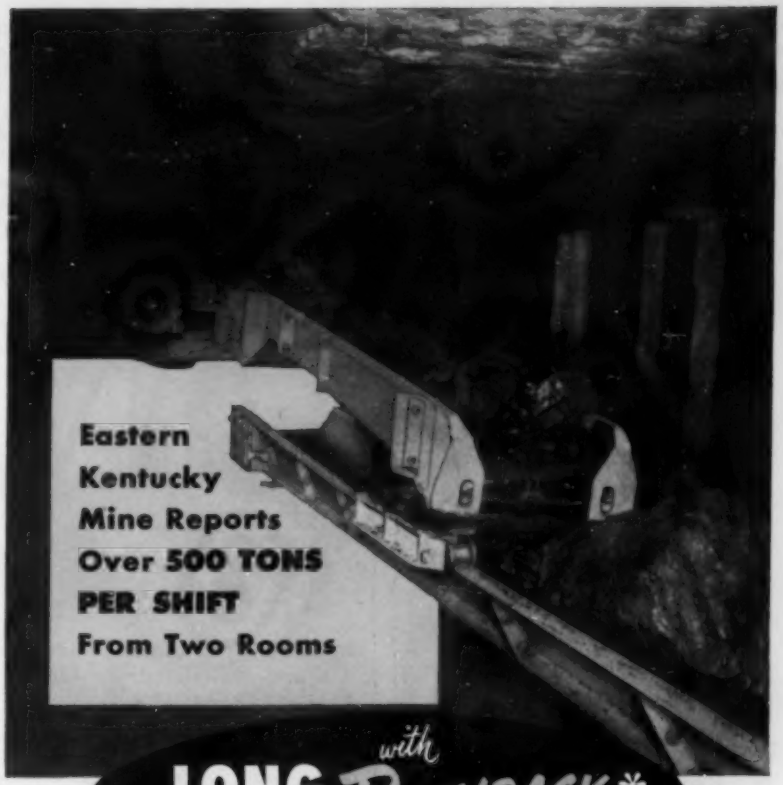
Through use of polyethylene insulating compound and a polyvinyl-chloride sheath, the cable has a smaller diameter and is lighter in weight than similar cables of equivalent capacity, providing lower installation costs, the maker reports. At the same time these compounds provide superior resistance to chemicals, moisture, mechanical damage and wear, for long service life, it points out. Offering high protection to personnel and against lightning, the cable is suitable for installation in boreholes, shafts, horizontal runs in underground entries, aerial suspension on insulators, and other mining and industrial applications, it is said. Available from No. 6 AWG to 250,000 cir mil.

ALUMINUM SIDING (24)

A new aluminum product designed to achieve more-attractive low-cost siding on industrial buildings, Alcoa ribbed industrial siding is intended primarily for frame-type structures but also can be used as a facing sheet on concrete-block buildings. The ribbed design of the sheet is achieved by trapezoidal corrugations. It is available with an embossed finish in lengths from 5 to 18 ft, and all conventional fastening methods are used in application. The embossed surface offers a stuccoed effect which diffuses light as it strikes the bright aluminum siding. Aluminum Co. of America, Pittsburgh 19, Pa.

AC WELDER LINE (25)

A complete new industrial line of low-maintenance AC welders for high-speed production, announced by the Geueral Electric's Welding Dept., consists of NEMA-rated 300-, 400-, and 500-amp models featuring stepless current control.



LONG with PIGGYBACK* ®
CONTINUOUS HAULAGE MINING

Utilizing two Piggyback Conveyors in 5 to 6 foot of coal, with mobile cutting, an eleven-man crew has consistently produced more than 500 tons per production shift out of only two rooms. This mine had been previously reported in a national magazine to show an average of 44 tons per man for an eleven-man crew for a sustained period.

You have known that conveyor mining is low maintenance mining. It is also well known that Piggyback mining has meant high tons per man from small crews in thin seams. Here is proof that Piggyback mining can also give high as possible total tonnage out of a concentrated area. Capital investment per ton for installing Piggyback mining in high coal, as well as low coal, is much lower than any other modern mining possibility.

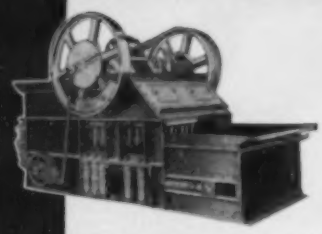
*Trade Mark

For complete details or a demonstration, write us today!

The LONG Company
OAK HILL, W. VA.
Formerly Long Super Mine Car Co.

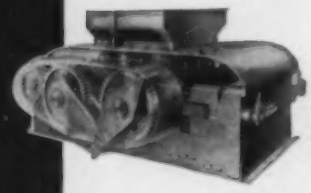
America's most complete line of CRUSHING EQUIPMENT

AVAILABLE FROM STOCK



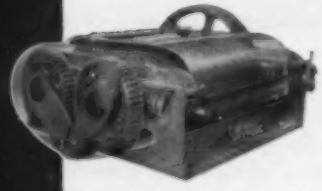
McNally Norton Vertical Pick Breaker

50% less fines when reducing lump to egg and stove sizes.



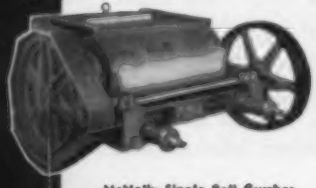
McNally Double Roll Gearmatic R. O. M. Breaker

Built in tonnage ranges from 750 tph to 1400 tph. Full floating Gearmatic drive.



McNally Gearmatic Stoker Coal Crusher

This unit offers three prime advantages:
High volume production, plus accurate sizing, plus low percentage of fines.



McNally Single Roll Crusher

Universal application. 20", 24" and 36" dia. rolls.

For immediate action on complete information write, wire or call . . .

Mc

★ Pittsburg, Kansas ★
★ Wellston, Ohio ★

silicone insulation and aluminum coil windings. They are equipped with a large current scale, which the operator can read from a considerable distance, and offer fingertip current adjustment, quieter operation, highly accurate current settings and wide current ranges. Designated 6WK30L, 6WK40L, and 6WK50L, the new welders are available for 220/440- or 500-v operation. Bulletin GEC-1259, G-E, Schenectady 5, N. Y.

MACHINERY STEAM CLEANER (26)

A new smaller all-electric hydraulic-jet cleaner for medium-duty applications, the Speedylectric Hydrasteam 180, available in both stationary and portable models, has been announced by the Livingstone Engineering Co., Worcester 5, Mass. Its steam source is the Speedylectric steam generator, said to be free from flames and smoke, self-regulating, 98½% efficient, simple, silent and compact. According to the maker the built-in Sellers hydraulic unit provides a solid jet of superheated water and detergent, propelled at high discharge pressure and powerful enough to remove grease deposits and soil encrustations which defy other cleaning methods. For delicate parts that must be protected from water and excess moisture, the Speedylectric Steam-Jet provides pin point cleaning under fingertip control of the operator. The units are available for operation on 220-, 440- or 550-v, 3- or 2-phase, 60- or 25-cycle power supply.

METAL SPRAY GUN (27)

Its new Turbo-Jet metalizing gun is so flexible that one gun will take care of all spraying operations—production, maintenance and anti-corrosion—according to the Metallizing Co. of America, Chicago 24. Weighing only 5½ lb, the gun may be used in a tool post or hand-operated and is designed to spray an extremely fine dense coating, using wire from 20 gage to 3/16-in diameter, from the highest melting point molybdenum to the lowest melting point wires. It is a general-purpose gun, used to spray both hard and soft metals, and it is not necessary to change worms, gears or feed rolls. The Mogul Turbo-Jet will operate on acetylene, propane or natural gas, and is said to have an extremely low gas and oxygen consumption.

RUBBER-TIRED SCRAPER (28)

New Allis-Chalmers Model 108 medium-sized rubber-tired pull scraper, with an 8.4-cu yd struck and 11-yd heaped capacity, brings to eight the number of A-C pull scrapers now available in sizes from 2-yd struck to 23-yd heaped. The cable-operated Model 108 has a cut width of 8½ ft and depth ranging up to 10 in, and features a three-piece reversible-type cutting edge; free-floating-type front apron; a low, wide bowl with curved bottom and smooth interior; and positive forced ejection for spreading. Bulletin MS-571-549, Tractor Div., Allis-Chalmers Mfg. Co., Milwaukee, Wis.

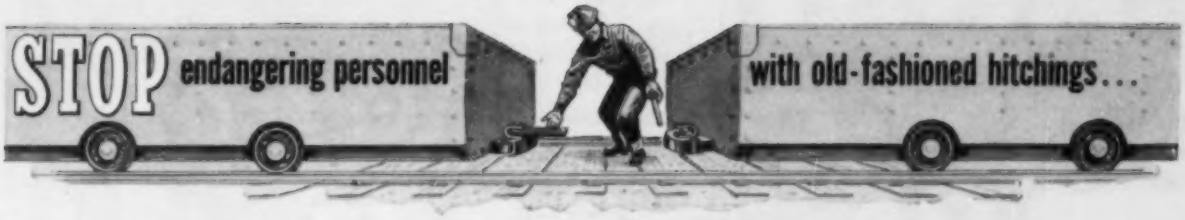
Equipment Shorts You'll Want to Check

(29) CHAIN REPAIR LINKS designed to enable dragline operators to repair drag chains with greater speed and ease, announced by Electric Steel Foundry Co., Portland 10, Ore., feature a change in the method of locking the link connecting pin in place. The "Spring-Lock" repair links are made of abrasion-resistant cast alloy with almost two times the yield strength of manganese, it is said.

(30) DC TACHOMETER GENERATOR, a new low-cost unit designed for a variety of control and measuring applications, as well as for accurate speed indications, has been announced by the General Electric Co.'s Instrument Dept., Schenectady 5, N. Y. The new generator provides an unusually high voltage output of 50v/1,000 rpm for speeds up to 5,000 rpm, and 100v/1,000 rpm for speeds up to 2,500 rpm, and is an effective pilot exciter for many control applications, according to the company.

(31) CHEMICAL-CARTRIDGE RESPIRATOR offering new safety with comfort and convenience, the new MSA "All-Vision" unit was designed to permit better vision and more freedom of movement while giving complete protection to men working in areas contaminated by light concentrations of organic vapors, acid gases, ammonia, dusts, mists, fumes and smokes. Bulletin 1007-5 with full details from Mine Safety Appliances Co., Pittsburgh 8, Pa.

(32) LUBRICANT-MEASURING VALVES—Hydraulically-operated valves for dispensing predetermined, measured quantities of lubricant now are available with any discharge output range



With Willison Automatic Couplers there's no need for personnel to go between cars to couple or uncouple. That means safety—and faster handling because Willisons uncouple from either side. All Willisons couple with each other automatically—there's no matching of coupler heads.

For safety, faster handling and larger tonnages—Willison Automatic Couplers and National Multi-Pad Rubber Draft Gears.

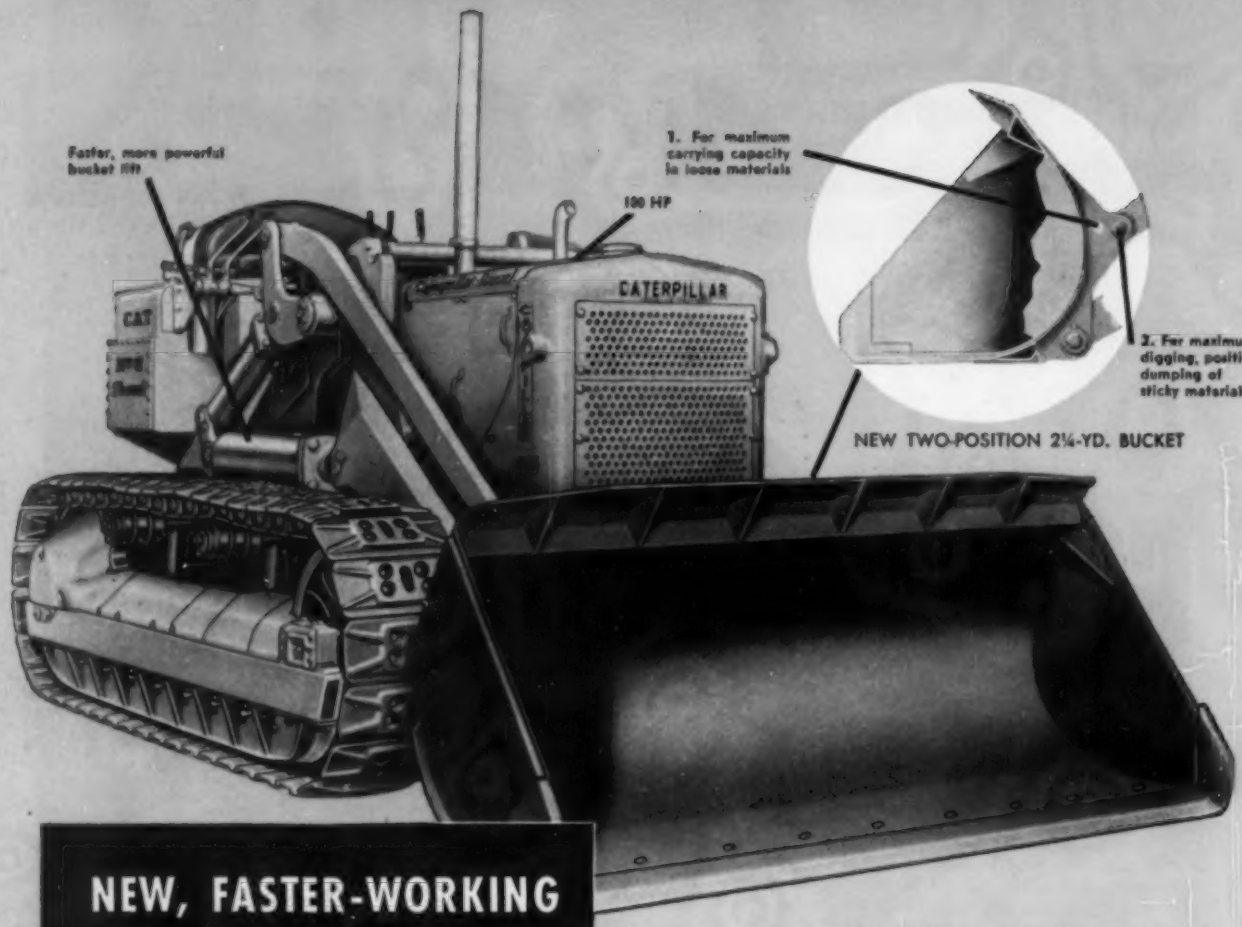
A-9021

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Cleveland 6, Ohio

WILLISON AUTOMATIC COUPLERS • RUBBER & FRICTION DRAFT GEARS • NC-1 CAR TRUCKS
NACO STEEL WHEELS • NACO STEEL LINKS & SWIVEL HITCHINGS

ANNOUNCING


Faster, more powerful bucket lift
100 HP
CATERPILLAR
1. For maximum carrying capacity in loose materials
2. For maximum digging, positive dumping of sticky materials
NEW TWO-POSITION 2¼-YD. BUCKET

NEW, FASTER-WORKING NO. 6 SHOVEL at no increase in price

NEW POWER—the CAT* Diesel Engine now gives you 100 HP, an increase of approximately 25 per cent—and you get it with Caterpillar ruggedness and economy. Direct electric starting for the diesel engine is now optional.

NEW 2¼-yd. BUCKET gives you 12½ per cent more capacity, gets heaping loads, dumps cleanly. Exclusive two-position feature gives maximum use of bucket capacity in *any* material: rear position for clean, fast dumping of sticky materials; forward position for carrying heaping loads of loose materials.

GREATER LIFTING POWER and speed with new hydraulic pump: its pressure is stepped up more than 40 per cent for fast, positive lifting action under *all* load conditions.

These extra values cost you no more in price!

These useful attachments increase your job range: skeleton rock bucket, quarry bucket, heavy-duty narrow bucket and bulldozer blade.

Versatile new No. 6 Shovel is built to do more work at less cost

Weight distribution, engine horsepower and bucket capacity are carefully balanced so that the tracks *stay* on the ground for maximum stability.

Your Caterpillar Dealer will be glad to demonstrate the new No. 6 Shovel *on the job*. See him today. And count on him for fast service and genuine factory parts.

Caterpillar Tractor Co., Peoria, Ill., U.S.A.

CATERPILLAR*

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desired, and incorporate an adjusting screw at each end of the measuring chamber for controlling the exact quantity of lubricant output, with mounting brackets to facilitate installation. Full specifications from Lincoln Engineering Co., Industrial Div., St. Louis 20, Mo.

(33) **MAGNETIC DISK BRAKE,** the new Stearns H-70 is for use on re-rated 3- to 20-hp motors, and is available in maximum torque ratings from 10 up to 105 lb-ft. It is designed to mount on new Frame Sizes 213 through 286, is up to $1\frac{5}{16}$-in shorter than previous brakes and also features the manual release-automatic reset wear indicator recently introduced on the new Stearns brake line. Details from Stearns Magnetic, Inc., Milwaukee 46, Wis.

(34) **ELECTRONIC LEVEL INDICATORS** in specially-designed explosionproof cases now are available for installation in various hazardous areas. Explosionproof Telstors are available in several combinations suitable for various applications, are easily installed and contain no moving parts that might clog or cause inaccuracies. Details from Fielden Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia 33.

(35) **DUAL-PURPOSE STEAM CLEANING COMPOUND,** "ST-35," not only is an additive to make steam cleaning more effective but, when diluted with hot water, does yeoman-service in cleaning both shop and office floors, the maker says. Technical data sheet 35 with details from John B. Moore Corp., P. O. Box 3, Nutley 10, N. J.

(36) **CONVERSION SLIDE RULE** designed to replace tables of equivalents and permit conversions in a single setting without computation, has 64 lunear, liquid, energy and miscellaneous factors on one side, plus a complete Trig Scale arrangement on the reverse side consisting of A, K, DF-CF, T, S, CI, D-D and L scales, the maker says. Details from Pickett & Eckel, Inc., Alhambra, Calif.

(37) **PORTABLE GROUND DETECTOR** and fault locator for use on energized power lines, the Brunt Faultfinder now is available in a Universal Model No. 54 for use on power voltages of 120, 240, 480, or 550 AC, or ungrounded DC. It is operated by one man, with no meters or instruments to adjust. Details from Parr Mfg. Corp., Newark 5, N. J.

(38) **WELDER-GENERATOR,** the "Weldanpower," is a combination welder and auxiliary, or standby, power unit for maintenance work, featuring low cost, large capacity and simultaneous output of both welding and auxiliary current, according to The Lincoln Electric Co., Cleveland 17, Ohio. Powered by 12-hp gasoline engine, it is rated as a 200-amp welder, a 4-kva continuous duty power unit and 5-kva for intermittent power.

FREE BULLETINS AVAILABLE

(39) **POWER-TRANSMISSION BELT**—Bulletin 6638 describing "Poly-V drive," Raybestos-Manhattan's new concept of belt power transmission, is offered by the Manhattan Rubber Div., Passaic, N. J., developers of the new belt and V-grooved sheave. Design characteristics of the single endless belt with molded length-wise ribs are explained, with details of the 14 specific advantages claimed for the drive.

(40) **EARTH AND COAL MOVERS**—Booklet MS-977 entitled "Modern Mining Methods" pictorially reviews A-C industrial equipment as applied by the mining industry. Available from Tractor Div., Allis-Chalmers Mfg. Co., Milwaukee 1, Wis., the booklet illustrates use of crawler tractors, motor and pull-type scrapers, motor graders, motor wagons and power units in stripping, road maintenance, coal storage and handling.

(41) **MOTION PICTURES** made available free to recognized groups by the U. S. Steel Corp., Pittsburgh 30, are described, with full details of obtaining them, in a new film catalog, the 14th edition. The booklet lists two new motion pictures, "Iron Ore from Cerro Bolivar," a film on the discovery and development of a new iron ore mine in Venezuela, and "The Waiting Harvest," a film on U. S. Steel's role in the production of basic chemicals from coal.

(42) **VALVE SELECTION**—New 20-p booklet, titled "Choosing the Right Valve," is offered by Crane Co., Chicago 5, to serve as a handy refresher in the application of basic valve designs for users and buyers of piping equipment. It illustrates and describes the design, operation and application of a great variety of valve types, each with some special qualification for service, from which the user may choose the right one to provide dependable and economical performance in each specific instance. Covered are such subjects as matching the valve's service characteristics with the service requirements, orginal valve cost, installation and maintenance costs.

(43) **HANDLING COAL**—Booklet D473 for large coal users such as power plants, steel mills and coal docks is entitled "Coal Handling" and explains use of Caterpillar's various wheel and track-type machines employed in stockpiling, storing and transporting coal, with on-the-job descriptions as to how heavy coal users handle their coal supply. Caterpillar Tractor Co., Peoria, Ill.

(44) **FREEZEPROOFING** — Recommended procedures for using calcium chloride in freezeproofing shipments of coal and other minerals are provided in Brief CoB-1, "Freezeproofing Coal with Calcium Chloride." Calcium Chloride Institute, Washington 6, D. C.

(45) **DIESEL-ENGINE MAINTENANCE**—New service bulletin offered by the Cummins Engine Co., Inc., Columbus, Ind., entitled "Give the Cooling System a Chance," points out that it pays to keep the cooling system in good condition because neglect will result in expensive repair bills or loss of an engine. Its many practical suggestions are not only for Cummins diesels, but may also be applied to all internal combustion engines.

(46-48) **LABORATORY TESTING AND EQUIPMENT**—Western Machinery Co., San Francisco 7, Calif., offers three bulletins on its testing services and equipment. Circle 46 for Bulletin L-1-I-1 describing laboratory heavy-media equipment for batch or continuous HMS processing of coal, aggregates and ores, with application details, product characteristics, specification drawings and data on the Wemco HMS laboratory cone unit, the laboratory drum unit and the laboratory media-cleaning unit. Circle 47 for Bulletin L-1-C-1 discussing laboratory testing of process methods for ores, coal, and sand and gravel, along with an analysis of typical process problems and their effective solutions by Wemco's laboratory test service. Bulletin L-1-F-1, available by circling 48, covers two Fagergren

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laboratory flotation machines for research and commercial testing, the Fagergren batch-type laboratory unit for individual batch testing and the 12-in Fagergren unit for continuous testing and pilot-plant operation.

(49) **BEARINGS** — Catalog TR-854-DC fully describing the Tru-Rol line of cylindrical roller bearings is offered by the Rollway Bearing Co., Syracuse, N. Y. It lists Tru-Rol bearing types, sizes, dimensions and load ratings; details their "crowned" rollers, a feature that relieves high stress areas at the roller ends; and includes a formula for load ratings, as well as a method of calculating expected bearing life.

(50) **CENTRIFUGAL PUMPS**—Bulletin W-395-B2 on self-priming centrifugal pumps from the Worthington Corp., Harrison, N. J., covers specifications, characteristics, applications and sizes of various types. The pumps are frame-mounted, with capacities to 550 gpm, heads to 140 ft and sizes from 1½ to 4 in.

(51) **PORTABLE ELEVATING TABLE** —Bulletin PS-54 shows the varied applications of the standard and specialized models of the Hamilton "Portelvator," suggesting possible uses in a mine shop or warehouse. A wheeled table or platform, the Portelvator is actuated through a hand crank to easily lift loads up to 2½ tons, with the lifting platform securely locked in place for movement of the load. Hamilton Tool Co., Hamilton, Ohio.

(52) **RECORDERS, ETC.**—New Bristol general bulletin covering its complete line of recording automatic controlling and telemetering instruments features the new line of Metagraphic pneumatic transmission instruments, which divide the functions of measuring, recording and controlling into three separate instruments to achieve maximum application flexibility. In addition, the bulletin describes briefly the full line of recorders and controllers for temperature, flow, liquid level, mechanical motion, running time, count, and operation and speed; and also includes Bristol's electric and electronic instruments for measuring current, voltage, power and other variables. Bulletin DM035, Bristol Co., Waterbury 20, Conn.

(53) **POWER UNITS**—Booklet on the new Willys "Power Giant" power units offers complete engine specifications, standard equipment and housing, with horsepower, torque and fuel consumption figures of four 4- and 6-cylinder Power Giant engines. Industrial Engine Dept., Willys Motors, Inc., Toledo, Ohio.

(54) **MAINTENANCE** — Johns-Manville, New York 16, offers a new edition of "Good Operating Practices," an illustrated 12-p brochure containing 101 suggestions for maintaining plant buildings and equipment. It contains the latest recommendations for getting the best service out of insulations, packings, refractory products, roofings and friction materials.

(55) **INDUSTRY SERVICES** and the diversified manufacturing activities of the Blaw-Knox Co., Pittsburgh 19, are shown in a recently published 50-p brochure entitled "This Is Blaw-Knox," offered by the company. It covers the products and services of all major departmental operations in the company's 11 divisions: Blaw-Knox Equipment, Buflovak, Chemical Plants, Foote Construction, Lewis Machinery, National Alloy, Power Piping and Sprinkler Rolls, and Union Steel Castings; plus a complete listing of available catalogs.

(56) **CRANE-SHOVEL** — 16-p Catalog 70/700-A released by Bay City Shovels, Inc., Bay City, Mich., describes design and construction features of its recently announced 1½-yd crane-shovel. The catalog covers many of the modern advanced designs and improvements in the large-capacity, low-weight, low-price convertible excavator, usable as shovel, crane, dragline, clamshell or hoe.

(57) **SPEED REDUCERS** — Shaft-mounted speed reducers offering additional advantages possible with double-enveloping worm gearing are detailed in Bulletin CD-323 available from Cone-Drive Gears Div., Michigan Tool Co., Detroit 12, Mich. In addition to full specification and selection data, it shows how the mounted reducers can be motorized simply and economically by use of bell housing adapters that accommodate standard NEMA C-type flanged motors from 1 to 5 hp.

(58) **WELDING EQUIPMENT** — 52-p Bulletin ADJC 662B from Air Reduction Sales Co., New York 17, provides full details on Airco line of gas and arc cutting and welding products, including complete welding outfits, welding machines, tips, torches, electrodes, accessories and other equipment, etc.

(59) **FIRE EXTINGUISHERS** — "Speed at your fingertips to stop fires fast" is the subject of Bulletin RG-154 issued by Stop-Fire, Inc., Brooklyn 1, N. Y. It describes portable one-hand-operated "Redi-Grip" fire extinguishers of the stored-pressure, vaporizing-liquid type, approved by Underwriters' Laboratories for use against Class B (inflammable liquid) and Class C (electrical) fires, and available in capacities from 1 qt to 1 gal.

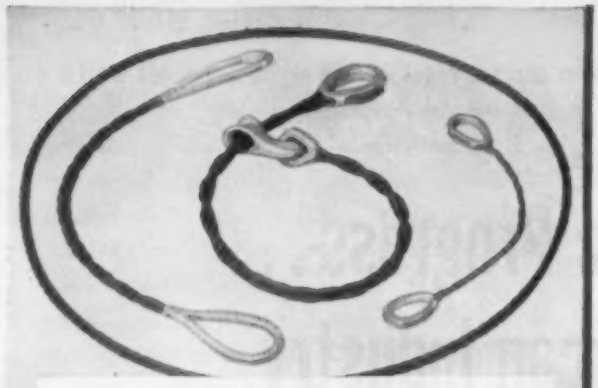
(60) **RELAYS**—Detailed descriptions of a complete line of industrial relays, plug-mounted for advantages in assembly, inspection, servicing and maintenance, include dimensional drawings, wiring diagrams and specifications on plug-mounted Classes A, B, F, S, and Z relays. Circulars 1801-1805, Automatic Electric Sales Corp., Chicago 7.

(61) **PAINTS**—Bulletin describes complete line of "Overust" antirust paints, with chemical properties, application methods and coverage figures for Overust black, red, gray, green, aluminum and clear. Chem Industrial Co., Brooklyn 9, Ohio.

(62) **ACTUATING VALVES**—16-p Bulletin 1010 covers complete Ledeen line of standard 4-way hand, foot, power and solenoid-operated valves built to operate single- or double-acting pneumatic and hydraulic cylinders and motors. Ledeen Mfg. Co., Los Angeles 15, Calif.

(63) **GASKET DESIGN**—"How Flange Surface Finishes Affect Gasket Sealability and Joint Performance" is the latest in a series of illustrated technical bulletins issued by Johns-Manville. For those who buy, specify or design joints in which gaskets are used, the bulletin provides a basis upon which to select the flange surface finish most suitable and explains why the right finish makes it easy to achieve an initial seal and the best joint performance. From Johns-Manville, New York 16.

(64) **HAND AND ELECTRIC HOISTING EQUIPMENT** is described in 12-p Bulletin 1567 by the Yale Materials Handling Div., Yale & Towne Mfg. Co., Philadelphia 15. Titled "There's a Yale Hoist for Every Lifting Job," it covers differential, screw-gear and spur-geared hand hoists, four types of electric hoists and the Yale "Pul-Lift" for either pulling or lifting jobs.



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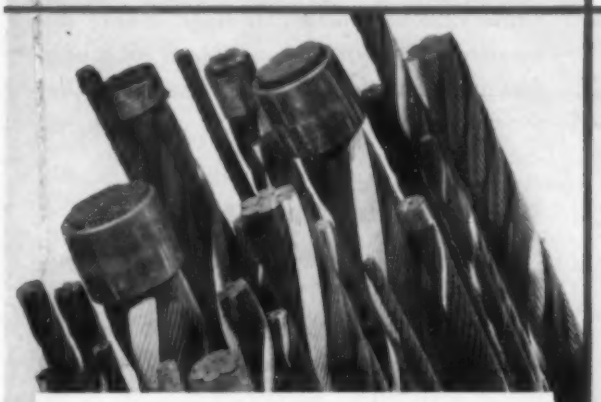

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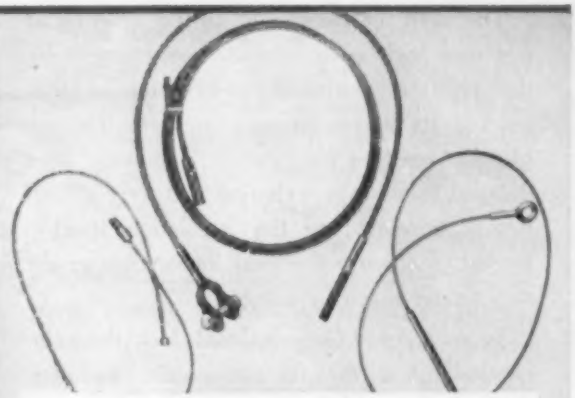

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Next Steps in Atomic Progress... A Challenge to American Industry

The purpose of this editorial is to throw light on the significance for American industry of recent changes in the statutes that control the development of atomic energy.

The need for clear light on the meaning of this new legislation is made more urgent by the political confusion and distortion that marked its course through Congress. The politically inspired charges of "giveaway" that delayed its passage—charges that were almost totally unrelated to the legislation itself—helped to obscure the vital importance of the step finally taken by Congress.

In sober, post-Congressional fact, the principal significance of the new atomic legislation is that it extends to private enterprise responsibility for the development of peaceful uses of atomic energy, whereas heretofore this responsibility has rested in a tight government monopoly. **And this extension is made on terms that emphasize the responsibility far more than they open any opportunity for economic gain in fulfilling it.** The revised Atomic Energy Act provides that:

1. Industry may now own and operate its own nuclear reactors, under license from the Atomic Energy Commission. And it may build and sell nuclear reactors for export.

2. Industry may use—but not own—nuclear materials at the discretion of the Atomic Energy Commission.

3. The Atomic Energy Commission will make available to industry scientific knowledge that may be useful in developing peaceful applications of nuclear energy.

4. For the first time, industry will have the right to patent inventions in the field of nonmilitary nuclear energy. However, "basic" discoveries must be made available to all companies in the field for a period of five years, after which they, too, will revert to normal patent status.

Two Kinds of Know-How

These provisions, despite the imposed limitations, represent the first positive step toward development of nuclear energy for peaceful applications in the United States. Potentially useful knowledge, previously locked in the minds of government scientists, will now be available to all those who are willing and able to put it to work for the good of mankind.

The advantages to be gained from enlisting the talents of American industry in the development of peaceful atomic applications are imposing. As *The* (London) *Economist*, Europe's leading economic journal, recently remarked, "The atomic scientists are in a position to surmise how atomic energy can be applied... but they lack the specialized knowledge of engineering design and operating technique just as industry itself lacks atomic knowledge." Now the engineers of private industry need no longer lack the atomic knowledge, and there is granted to them at least a restricted freedom to apply it to the solution of their engineering and operating problems.

But the new opportunity for private industry to find constructive uses for the science of nucleonics carries with it a grave responsibility. These uses must be so developed that they will benefit the people of all the free nations. It is essential that the United States, which pioneered in developing lethal uses for atomic fission, demonstrate to the world our paramount interest in its peaceful application. It would be a moral set-back to the free world almost beyond calculation if the Communists should be able to offer to the poorer nations of the world the benefit of low cost atomic power—provided by Communist technicians—while we concentrate primarily on building our stockpile of atomic and hydrogen bombs.

Race For a Peaceful Victory

Most of the experts are agreed that it may be many years—perhaps ten, fifteen or more—before the cost of electricity from atomic fission can be reduced to a level that will make it competitive with conventionally produced power in most regions of the United States. But most of the world is not nearly so fortunate as we are in power resources. Electricity, even at a cost far higher than the average that prevails in the United States, would be a blessing in many countries, and the nation that provides the technology to bring it into being will score a great moral victory.

The useful potential of nuclear energy is not restricted to the generation of electric power—although twenty years from now this use will be highly important to the power industry of the United States. Even with the limited research that has been done in this field thus far, the use of radioisotopes—the radioactive products of atomic reactors—is saving American industry an estimated $100 million a year. Commissioner Campbell of the AEC, who made this estimate, believes that these savings may well reach $1 billion a year within ten years. Radioisotopes are already at work in industries ranging all the way from paper manufacturing, where they measure paper thickness, to pipeline transportation, where they mark the dividing lines between shipments of different products (at an estimated saving of $500,000 a year). Medical applications of these same radioisotopes hold promise of longer and more comfortable lives for those who are stricken by cancer and other diseases.

Above All a Challenge

The new Atomic Energy Act is a crucial stride toward the day when all these benefits—and undoubtedly others not yet revealed by research—will be realized. But it is a step that is essentially permissive. It still leaves it to private industry for the most part to decide what is to be done and how soon.

The new act is thus, above all, a challenge. It confers on private industry the responsibility to assume a leading role in the development of peaceful uses for nuclear energy, a step long urged by NUCLEONICS, a McGraw-Hill magazine devoted to atomic energy. To achieve a success in this task that will measure up to the requirement of the national interest, this development must command all the resources and ingenuity that private enterprise can apply—and do so without promise of glittering prizes surely to be won. **But now that the responsibility has been defined and the challenge offered, American industry will, we believe, measure up to its grave and mighty import.**

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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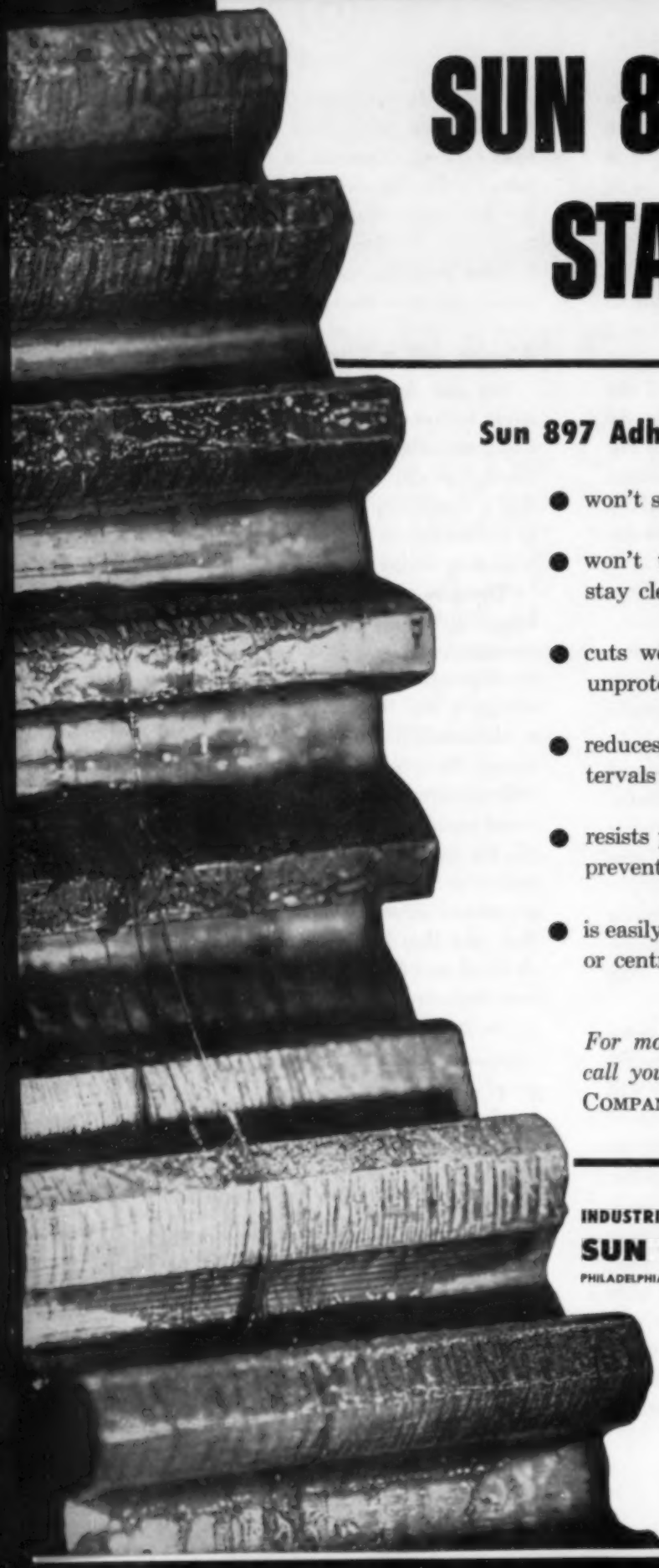

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NEWS ROUND-UP

FOA Coal-Export Program Takes Shape Slowly

ALLOCATIONS in the Foreign Operation Administration's coal-export program totaled well over 500,000 tons at the end of October, out of a total of 10,000,000 tons the government will make available to nations overseas under a plan announced early last August. Further allocations will be announced by FOA as agreement for coal purchases is reached by countries that will receive the coal.

Under the FOA program, bid invitations have gone out from Spain for 118,000 tons and from Greece for 70,000 tons. In addition, another 50,000 tons may be shipped to Greece, mostly from Pennsylvania. About 125,000 tons, to be purchased mostly in Kentucky, has been designated for immediate shipment to Korea. And Yugoslavia has been authorized to spend $1,620,000 for fuels from the United States—a figure that should purchase about 150,000 tons of low-volatile coking coal. Harold Stassen, FOA administrator, recently told a Pennsylvania audience that that state could count on the sale of about 130,000 tons out of the 700,000 he expected to allocate in the immediate future, and about 2,000,000 out of the total 10,000,000 tons in the over-all program.

Denmark, meanwhile, faced with suspension of imported Polish coal as well as higher prices that lift Polish coal up to a level competitive with U. S. coal, considered ways and means to increase purchases of American coal through FOA. Danish importers were informed by Poland in October that all coal shipments had been suspended, presumably because of dissatisfaction with the rate of Danish exports to Poland.

In designating areas in which FOA-exported coal is to be produced in the United States, FOA officials turned to mining areas in Pennsylvania and eastern Kentucky that have been classified as labor-surplus or distress areas by the Department of Labor. Generally, coal for military purposes will be purchased through the Office of Naval Procurement; for civilian uses, through the General Services Administration.

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News Briefs and Trends

Pittsburgh-Consol Acquires Jamison Coal & Coke Co.

The Pittsburgh Consolidation Coal Co. last month reported that it had acquired, effective Sept. 30, the Jamison Coal & Coke Co., Greensburg, Pa., operating coal properties in Pennsylvania and West Virginia. Jamison's affiliates, the Stewart Coal & Coke Co., operating in Pennsylvania, and the South Union Coal Co., in West Virginia, were not involved in the arrangement. While no final purchase price was announced, George H. Love, Pitt-Consol president, had confirmed Sept. 4 that his company submitted an offer to purchase the Jamison company for a cash consideration of approximately $10 million, which was subject to acceptance by Jamison stockholders.

New Group Active in W. Va. Coal & Coke Corp.

Acquisition of 44% of the outstanding common stock of the West Virginia Coal & Coke Corp. by Simon H. Scheuer, New York real estate man, and 16 of his business and professional associates, was announced Oct. 15. Earlier, the company had announced the election Sept. 15 of Morris Creditor as president to succeed T. G. Gerow, resigned, and the promotion of A. H. Crane from vice president to executive vice president, to succeed Mr. Creditor. Also announced last month was the election of Orrin G. Judd, New York, as chairman of the executive committee, to succeed Henry S. Sturgis, resigned, and that of Eli Goldston, Cleveland, as vice president-counsel. While an offer for a part of its coal holdings is being considered, the company has no intention of disposing of all its coal properties, it said.

Railroad Crewman Killed in W. Va. Mine Dynamiting

The fireman of a train hauling coal from an operation of the Maust Coal & Coke Co., near Jerryville, W. Va., was killed Oct. 20 when a dynamite blast resulted in derailing of the locomotive, tender and three cars of the 39-car coal train. The explosion was the latest in the series of violence in the union's drive against the Maust organization, which began early in September when employees of the company's three unionized deep mines struck in protest against the use of non-union labor at its strip properties. At the time of the blast, the railroad was hauling its first load of coal from a Maust mine since one of its bridges was dynamited Oct. 1. Earlier,

(Continued on p 150)

Pennsylvania Conference Seeks National Support for Coal Program

A state coal conference led by Pennsylvania Gov. John S. Fine was reported at mid-October to be seeking the congressional voting strength of 16 states in support of a program to aid the bituminous and anthracite industries. Meeting at Harrisburg Oct. 14, the conference, including representatives of coal operators, mineworkers, state colleges and universities, and the general public, resolved to invite 32 senators and 163 congressmen to a conference at Washington in January.

A spokesman for Gov. Fine, who heads the Pennsylvania state conference as well as the National Governors' Fuel Conference, said the program for the Washington conference probably will include the following: opposition to imports of residual oil, research into new uses for coal and its by-products, removal of inequities in freight rates on coal, and a curb on the dumping of excess natural gas at cut-rate prices for utility use.

Gov. Fine stated that he hopes to coordinate the programs of the several coal-producing states into a single plan for presentation to Congress next year. Meanwhile, he urged that the coal industry "demonstrate the economic statesmanship and maturity to transcend its own internal competitive struggles at this juncture in the industry's history to sustain a common program that might by cooperation assure its survival as a major economic force."

Natural Gas Substitutes Said to Insure Supply

The development of natural-gas substitutes virtually insures the nation of an adequate gas supply for the next 150 to 200 yr, according to a report given Oct. 8 by Capt. E. S. Pettyjohn, vice president and director of the Institute of Gas Technology, Illinois Institute of Technology, Chicago, at the 13th annual meeting in Atlantic City, N. J.

Mr. Pettyjohn said the gas industry can look forward to an enduring and productive future although the natural-gas supply is not unlimited. He pointed out that the Institute of Gas Technology—the gas industry's own educational and research facility—in recent years has developed processes for the production of natural-gas substitutes from coal, natural-gas condensates, and petroleum.

"This country's supply of natural gas is sufficient to meet the major portion of the nation's anticipated needs for some little time," Mr. Pettyjohn stated. "However," he added, "supplementary sources are required for winter peak loads in areas distant from production and storage fields, and additional sources will be necessary to augment future gas utility requirements."

"The complete gasification of coal will insure an unlimited gas supply for the foreseeable future," Mr. Pettyjohn declared. "The Institute already has developed a process of gasification of coal without coke, tar, or other by-products."

State-Wide Meets in West Virginia, Tennessee

Top honors in the West Virginia All-State First Aid Contest held in Charleston Oct. 2 went to the Gary team of the U. S. Steel Co. captained by John Dickinson. Placing second in the field of 41 teams participating was that of the Wharton No. 2 day shift, Coal Div., EG&FA, captained by William Laudermilk; and third was a team from EG&FA's Keystone mine headed by Earnest Moore. Frank B. King, chief of the West Virginia Dept. of Mines, was general chairman of the contest, and speakers included Gov. Marland.

In Tennessee, a team of the Southern Collieries, Inc., Lake City, placed first in the Coal Mining Div. of the Second Annual Tennessee Mineral Industries Safety Day First Aid Contest. Second place went to the team representing the Blue Diamond Coal Co., Eagan. In the mine rescue contest, the team from the New Jellico Coal Co., Vaspar, ranked first. Jake R. Miller, chief inspector of the Tennessee Div. of Mines, was general chairman for the meet.

In its first competition since winning the 1953 National First Aid Championship, the Bergoo No. 4 team of the Pardee & Curtin Lumber Co. took top honors at the 4th Annual Safety Day of the Mid-State Coal Mining Institute held at Camp Caesar, W. Va. Pardee & Curtin's Bolair team placed second, and third place went to the Cornelia mine team of the Peters Creek Coal Co.

Personal Notes

Ralph Allenbaugh, associated with The New River Co. for more than 30 yr, has been named superintendent of the company's Lochgelly mine, Mt. Hope, W. Va., replacing **John Harsany**, resigned. Succeeding Mr. Allenbaugh as superintendent of New River's Cranberry (W. Va.) mine is **David C. Sizemore**, formerly general superintendent for the Lillybrook Coal Co.

The appointment of **Julius C. Olzer** as administrative assistant in the W. Va. Department of Mines was announced Oct. 15 by Frank B. King, chief of the department. Mr. Olzer, who joined the department as a safety instructor in 1951, has been serving as inspector-at-large for the Kanawha division. **H. L. Schweinsberg**, former director of mine rescue and safety, who has been acting administrative assistant, has been named to the newly created post of ventilation expert, Mr. King announced.

B. C. Miles has been promoted to plant and preparation manager for the West Gulf mine of the Gulf Mining Co., Maben, W. Va. Mr. Miles, who has been with the company for 5 yr, formerly was tipple foreman at the mine.

William N. Clagett, assistant chief mine inspector for the Pocahontas Land Corp., has retired after nearly 50 yr of service in the coal-mining industry. He has been with the Pocahontas organization since 1923. Mr. Clagett attended Virginia Polytechnic Institute and began his mining career in 1906. He first joined the Algonquin & Pawama Coal Co., and then worked for the U. S. Steel Co. at Lynch, Ky., for 3 yr. He served as an engineer with the American Coal Co. and also was with the Norton Coal Co. before joining Pocahontas Land Corp.

Orrin T. Barrett, formerly associated with the Guyan Eagle Coal Co., Amherstdale, W. Va., has returned to this country and will again engage in coal preparation work, following completion of a contract with the Brazilian National Steel

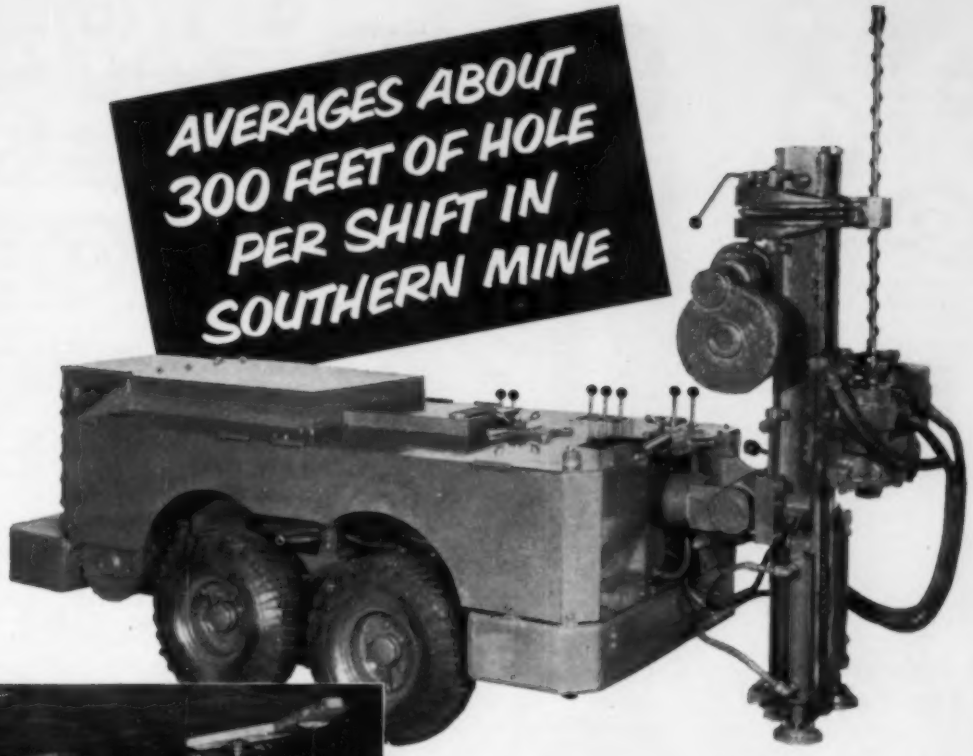
NCA Advances Cunningham

JAMES H. CUNNINGHAM, former assistant director, has been appointed director of public relations, National Coal Association, succeeding Ralph C. Mulligan who is retiring, it was announced Oct. 1 by Tom Pickett, NCA executive vice president. Mr. Mulligan will continue to serve NCA in a consulting capacity. Mr. Cunningham, a member of the NCA staff since 1948, has served for the past 3 yr as Mr. Mulligan's principal assistant in BCI and NCA's public relations department. Mr. Mulligan, who first served NCA part-time in publicity, has headed BCI since 1946.

Gray Heads USS Coal Div.

JAMES C. GRAY has been appointed vice president—operations—coal, U. S. Steel Corp., heading the company's coal-mining activities in Pennsylvania, West Virginia and Kentucky, it was announced Oct. 25 by Harvey B. Jordan, executive vice president—operations. Mr. Gray, who has been manager of manufacturing operations for U. S. Steel's Tennessee Coal & Iron Div., succeeds Karl L. Konnerth, who resigned, effective Nov. 1. A graduate of Penn State College with a BS in Mining Engineering, Mr. Gray began his business career in 1925 with The Hudson Coal Co. and joined U.S. Steel 12 yr later as superintendent of the TCI Wylam mine. He was made chief inspector, coal mines, in 1940 and general superintendent of coal mines 3 yr later. In 1948 he was named assistant manager of raw materials and, in 1951, became manager of manufacturing.

AVERAGES ABOUT 300 FEET OF HOLE PER SHIFT IN SOUTHERN MINE



Better check up on the RBD-15 SELF-PROPELLED HYDRAULIC ROTARY DRILL for your Roof-Bolting job

An Alabama mine operating in coal 48″ to 56″ high, with parting rock 5″ to 6″ thick, uses a Joy RBD-15 to drill and pin expansion bolts in roof rock that is mainly dense slate, with thin sandstone strata occasionally. The drill is used in air course and headings in development, primarily where continuous miners, loaders and shuttle cars are being operated. Holes are drilled from 30″ to 40″ in depth, and the number of holes varies from 75 to 125 per shift, easily keeping pace with the mechanized mining equipment.

Chief features of the RBD-15 are its high maneuverability, flexibility and great drilling power. It can turn in its own length, handle as readily as a crawler-mounted unit in tight places, and position holes quickly and accurately. With just the touch of centralized hydraulic controls, it gives the operator an infinitely variable range of thrust, feed, rotation speed and torque to meet any and all conditions of drilling and pinning.

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Co. in southern Brazil. Before going to Brazil in 1952, Mr. Barrett also had been associated with the USBM and the Pittsburgh Coal Co., in coal preparation.

Harry M. Johnstone, consultant for the Gorgas mine of the Alabama Power Co., Gorgas, Ala., retired Oct. 1. He joined the company in 1942 as manager of mines at Gorgas, and in 1953 was named general manager of mines. Earlier this year he became mine consultant at Gorgas. A graduate of Alabama Polytechnic Institute, Mr. Johnstone previously had been associated with the Jagger Coal Mines, the Gallowway Coal Co. and the Republic Steel Corp.

Harry W. Bradbury, president of the Sparta Coal Co., Inc. and the Midwest Utilities Coal Corp., last month was elected executive vice president and chief executive officer of the Lehigh Valley Coal Corp., Kingston, Pa., succeeding **William Findlay**, who resigned Oct. 1.

George G. Guiney, who has had 41 yr experience in the coal mining industry, has been named an Illinois state mine inspector. Mr. Guiney will be an accident-prevention inspector in central and southern Illinois.

USBM Reorganizes, Shifts Top Personnel

Appointments to a number of newly created positions in the U. S. Bureau of Mines were announced Oct. 12 by Secretary of the Interior Douglas McKay. The positions were established as part of the reorganization of the Bureau based on the report of a survey team issued last July and the new appointments will become effective when the changeover from the present Bureau organization can be made and the new organization formally established, which is expected to take place about Jan. 1.

Thomas H. Miller, former assistant director for operations, becomes deputy director; Paul Zinner, formerly chief of the Minerals Div., becomes assistant director in charge of programs; and James Westfield, formerly chief of the Health and Safety Div., becomes assistant director in charge of health and safety operations. The new Washington headquarters division chiefs include Louis C. McCabe, Solid Fuels Div.; and Harry F. Weaver, Coal Mine Inspection Div.

The new regional directors, who will be in charge of all Bureau operations in their respective areas with the exception of health, safety and coal-mine inspection work, are:

Stephen M. Shelton, Region I, comprising the states of Idaho, Montana, Oregon, and Washington, and the Territory of Alaska.

Harold C. Miller, Region II, California and Nevada.

John H. East, Jr., Region III, Arizona Colorado, Nebraska, New Mexico, North Dakota, South Dakota, Utah and Wyoming.

Harold M. Smith, Region IV, Arkansas, Kansas, Louisiana, Mississippi, Missouri, Oklahoma and Texas.

Harold P. Greenwald, Region V, all states east of the Mississippi River, except Mississippi, plus Minnesota and Iowa.

Appointment of chiefs of the new Health and Safety Div. will be announced later, along with other appointments, USBM Director J. J. Forbes said. The recommendation of the survey team that the number of regions be reduced from nine to four was modified because of the character of the Bureau's activities in the Pacific Northwest. After careful study, Secretary McKay decided that separate administration of Regions I and II, which the team had proposed consolidating, would make for greater economy and efficiency.

Washington headquarters divisions prior to the reorganization were Minerals, which is substantially unchanged, Fuels and Explosives, now divided into the Solid Fuels Div. and the Petroleum and Natural Gas Div., the Health and Safety Div., now divided into the Health and Safety Div. and the Coal Mine Inspection Div.; and the Administrative Div., the functions of which have been changed but little. The new Foreign Div. takes over the functions and duties of former Region IX.

Kanawha Valley Program Puts Safety Before Community

THE 23RD ANNUAL SAFETY DAY of the Kanawha Valley Mining Institute held Saturday, Sept. 25, in Montgomery, W. Va., attracted some 6,000 people into the city to view the all-day program sponsored by the institute in co-operation with the West Virginia Institute of Technology. Highlights of the day included a parade with floats sponsored by member coal companies, first aid and mine rescue demonstrations, a band competition, safety skits and exhibitions and an open-house at W. Va. Tech.

As a departure from the usual first aid contest, the institute had one first aid and one mine rescue team on the field to demonstrate their technique, with the problems and the teams' handling of them explained to the audience over a public address system. The first aid demonstration was presented by a team from the Truax-Traer Coal Co., and the mine rescue problem was worked by a team from the Central Appalachian Coal Co.

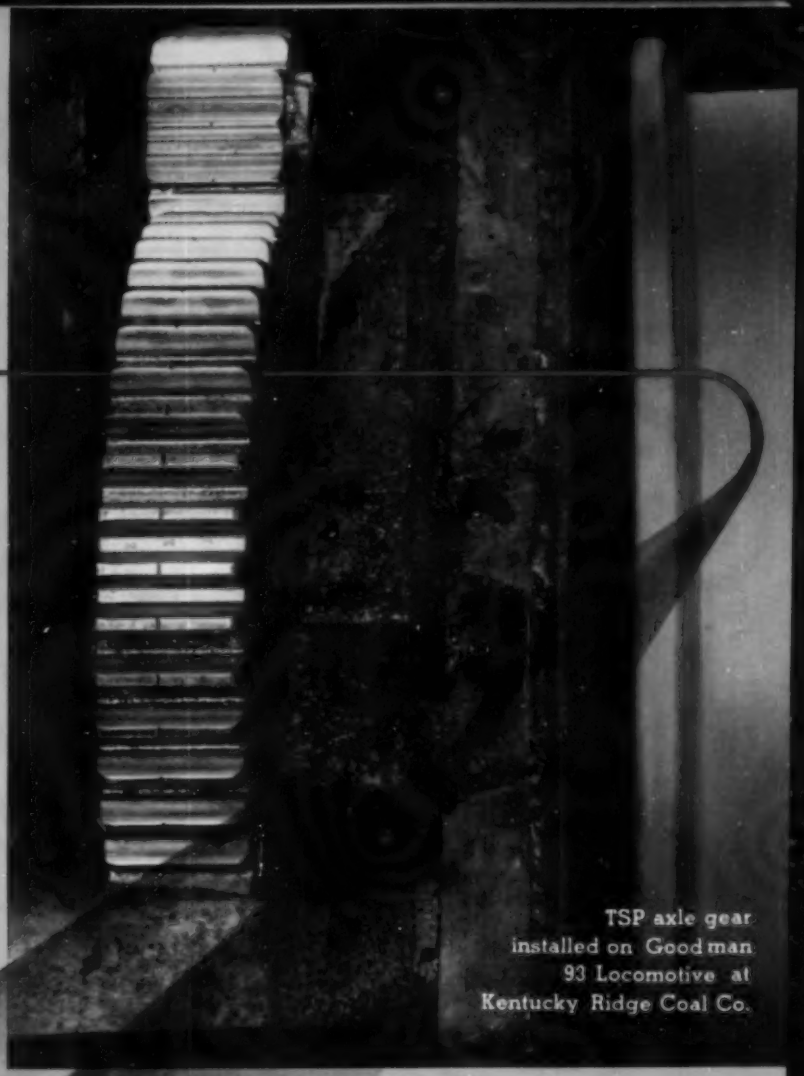
Other events on the program included a coal dust explosion staged by the USBM, a display of a jet plane by the U. S. Air Force, landing of a helicopter, movies and vaudeville acts. Typical of the floats entered in the parade was that of the Valley Camp Coal Co. shown above.

Among the institute officials and others participating were (right photo, left to right): W. B. Devaney, institute president, Cannelton Coal Co.; F. J. Stortz, USBM; Joseph Mulligan, Semet-Solvay Div.; A. L. Clark, Imperial Colliery Co.; M. L. Alley, Gauley Mountain Coal Co.; C. V. Hunt, Semet-Solvay Div.; R. S. Long, general safety day chairman, Riverton Coal Co.; H. A. Jones, Carbon Fuel Co.; A. V. Faull, Wyatt Coal Co.; Robert Lambie, Mine Safety Appliances Co.; M. M. Lononsy, Montgomery Mayor; F. J. Peternell, Truax-Traer Coal Co.; Robert Norcross, W. Va. Coal Association; and Joshua Smith, Coal Div., EG&FA.

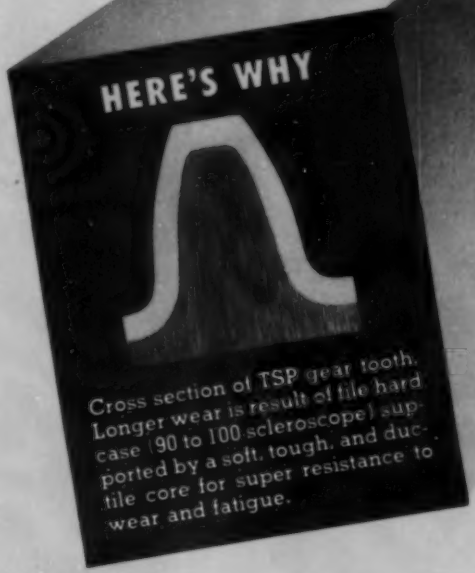
Kentucky Ridge Coal reports...

17 YEARS

OF HARD WORK ... AND PLENTY OF HARDNESS LEFT IN THIS TSP* AXLE GEAR



TSP axle gear installed on Goodman 93 Locomotive at Kentucky Ridge Coal Co.



Cross section of TSP gear tooth. Longer wear is result of tile hard case (90 to 100 scleroscope) supported by a soft, tough, and ductile core for super resistance to wear and fatigue.

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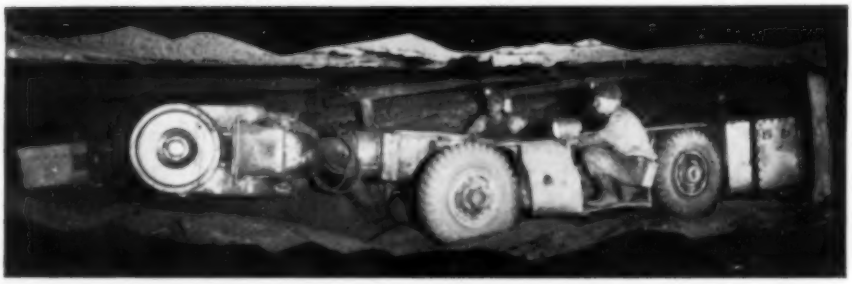

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Atomic Power—When and How Much?

COMPETITIVE ELECTRIC POWER from nuclear fission is sure to come but will not seriously affect fossil-fuel industries in the foreseeable future. That is the cross-section of opinion expressed by physicists, engineers, electric-utility spokesmen and others who attended the National Industrial Conference Board's third meeting on Atomic Energy in Industry, October 13-15, at New York City.

Following is a brief summary of opinions expressed at the meeting:

Displace Fossil Fuels?—Not for a long time, if at all. Fact is, nuclear fuel 25 yr or so from now will hardly ripple the surface of the petroleum industry. By that time, natural gas will be burned for higher purposes than boiler fuel. Power demand will be immense, and the utility industry will depend primarily on coal. No efficient plant existing 25 yr from now will be shut down or converted to nuclear fuel.

What Price Nuclear Power? And When?—Lack of agreement on cost and date was notable at the meeting.

The less optimistic view comes down to this: The outlook is long-range and the task is hard. A competitive nuclear power plant must produce power at a cost equal to or lower than that produced by the best conventional plant that could have been built instead. Nuclear-power costs will come down, but future cuts in the cost of conventional power will delay the day when nuclear power catches up. To make nuclear power competitive today, engineers would have to improve estimated costs by the following factors: Construction costs, 4; fuel-fabrication costs, 8; fuel-element irradiation life, 5; over-all thermal efficiency, 1½; nuclear-fuel costs, 1; operating and maintenance costs, 2; operating factor, 1½; chemical-separation costs, 2; waste disposal, 2; useful life of plant, 1½. Today, estimated nuclear-power costs at the projected Shippingsport, Pa., plant of Duquesne Light Co. range from 12 to 16 mills per kilowatt-hour.

The most optimistic view takes this line: With known technology, a nuclear power plant can be built today for $174 per kilowatt of installed capacity. With fixed charges thus held low, power could be produced at 7 mills.

Other views, not as far out on a limb as the one above, put capital cost of a nuclear power plant at $250 per kilowatt but point out that lower fuel costs, about 1.35 mills per kilowatt-hour, will offset higher fixed charges. To be competitive, a nuclear plant must spend little for its exclusion area, operate at a load factor of 90% or more, provide high power output per unit, run on a 3-yr fuel cycle, keep chemical-processing costs in the area of $1 to $2 per gram of product and keep construction and amortization costs low. If this can be done, power costs may range from 4 to 16 mills, with an average close to 7 mills.

Where Build Nuclear Plants?—Factors in locating a nuclear power plant include the following:

1. Water—A nuclear plant will need even more water than a coal plant.

2. Nearby Power Load—Because of transmission costs, the nuclear plant, like a coal plant, must be close to the power load.

3. Station Size—An increase in reactor capacity will cut costs more than a corresponding increase in coal-plant capacity. Competitive nuclear plants therefore must be large and must be close to the power load in big population centers.

4. Waste Disposal—Availability of disposal areas for poisonously radioactive wastes will influence site selection.

5. Present Power Costs—Nuclear plants will be built only where they can beat conventional plants on the cost of producing power.

6. Fuel Sources—Because nuclear fuel bulks small, nuclear plants may appear first where fossil-fuel transport costs are high.

7. Safety—Since a nuclear plant is not a bomb, the danger of blast is not a factor in plant location. But a "runaway," i.e., overheating, causes dangerous radiation and disperses radioactive wastes. The exclusion area therefore must be adequate. The problem is to find an adequate tract of land at reasonable cost.

What About Safety?—Investment in safety must be gaged to the possibility of catastrophic accident. Though real progress is being made in safety, no fully satisfactory way has yet been found to dispose of radioactive wastes. Conventional sprays, filters, etc., do not fill the need. Cost of known disposal methods, now ranging from 30c to $2 or more per gallon or pound, are forbiddingly high. Insurance costs are so high that the government may have to assume part of the load.

While valuable experience was gained in putting Canada's Chalk River nuclear reactor back into operation following a "runaway" 2 yr ago, the language used to describe removal and disposal of the contaminated components gives some measure of the magnitude and character of the safety problem. The report on that "incident" included such words as "shroud," "corpse," "resting place," "burial ground" and "cortege." That is not reassuring language.

How Much Power? And How Much Fuel?—If assumptions offered in a recent study for the Atomic Energy Commission come true in the future, development of fission fuels eventually may leave fossil fuels to the chemicals industry. That study assumed nuclear-power capacity in the United States of 12,000,000 kw by 1970, 42,000,000 kw by 1980 and 100,000,000 kw by 1990. Worldwide, the study assumed 30,000,000 kw of capacity by 1970, 100,000,000 kw by 1980 and 250,000,000 kw by 1990. With estimated inventory requirements of 600 tons of uranium per 1,000,000 kw and annual replacement needs of 50 tons per 1,000,000 kw, world needs in 1970 would total 18,000 tons of inventory and 1,500 tons of annual fuel replacement. Experts predict that adequate quantities of fissionable fuel will be available to meet these needs.

Bringing Atomic Energy Down to Earth

Scan newspaper headlines, and you might think competitive electric power from nuclear fission spells doom for coal tomorrow.

But attend a meeting where hard-headed business men, leaders in the electric-utility industry, practical engineers and physicists wrestle with the realities of power from the atom, and you begin to see sound reasons for modifying your views about the respective roles of coal and the atom in future power generation.

Such a meeting was the recent one of the National Industrial Conference Board, reported on this page. NICB is an association of the Nation's top industrialists and business men who conduct unbiased research in economics, business management and human relations. Their meeting was the third in an annual NICB series on Atomic Energy in Industry.

To stay on top of today's developments affecting coal and to peer a little into the future, a *Coal Age* editor listened throughout the recent 2 1/2-day NICB meeting. His report should reassure coal men.

NEWS of your company, personnel changes and other activities, are interesting to other Coal Age readers, so why not make it a point to tell us about them. Write The Editor, Coal Age, 330 W. 42nd St., New York 36, N. Y.

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SPEAKERS AT MINERAL PRODUCERS' MEETING—Lester P. Barlow (left), Gimite Corp.; F. H. Mohney, Mineral Producers' Association; W. G. Montgomery, Jeffrey Mfg. Co.; R. J. Trace and Irvin Graybill, Jr., Commonwealth of Pennsylvania.

Mineral Producers Discuss Legal and Technical Problems

INDUSTRY MEETING — A Special COAL AGE Staff-Written Report

THE GOVERNORS' FUEL CONFERENCE represents the greatest mobilization of political influence ever brought to bear upon the problems of a single industry, according to Robert J. O'Donnell, planning and research consultant to Governor Fine of Pennsylvania, and principal speaker at the 11th annual dinner of the Mineral Producers' Association held at the William Penn Hotel, Pittsburgh, Pa., Oct. 7. The annual dinner climaxed the association's one-day meeting, which included a morning business session and luncheon for the members of the group, and an afternoon session featuring speakers on legal and technical matters of interest to the membership. Hosts at a reception preceding the dinner were Atlas Equipment Corp., Highway Equipment Co., and Frank Swabb Equipment Co.

The Governors' Fuel Conference, Mr. O'Donnell said, is an effort to generate effective and speedy action toward the solution of current problems in coal-producing regions. The problem is a national one, and the permanent solution will require long-term effort. But there are immediate problems and the conference, sparked by Governor Fine, is hopeful of securing early remedial action on these, Mr. O'Donnell continued.

In setting up the organization, the governors of 16 coal states hoped to establish a pool of experience among their coal people and then to establish a national consensus of the industry. State conferences have been organized for the initial purpose. The follow-up will come at a national meeting at Washington in January, where a program will be hammered out to present to Congress. One-third of the Congress sits in representation of the 16 coal states, Mr. O'Donnell stated, in pointing out the extent of coal's possible legislative mobilization.

Chairman of the dinner program was Alan R. Davidson, president, Maple Hill Coal Co., and retiring chairman of the association. Matthew A. Crawford, general counsel of the association, was toastmaster. Succeeding Mr. Davidson as chairman of the association is W. C.

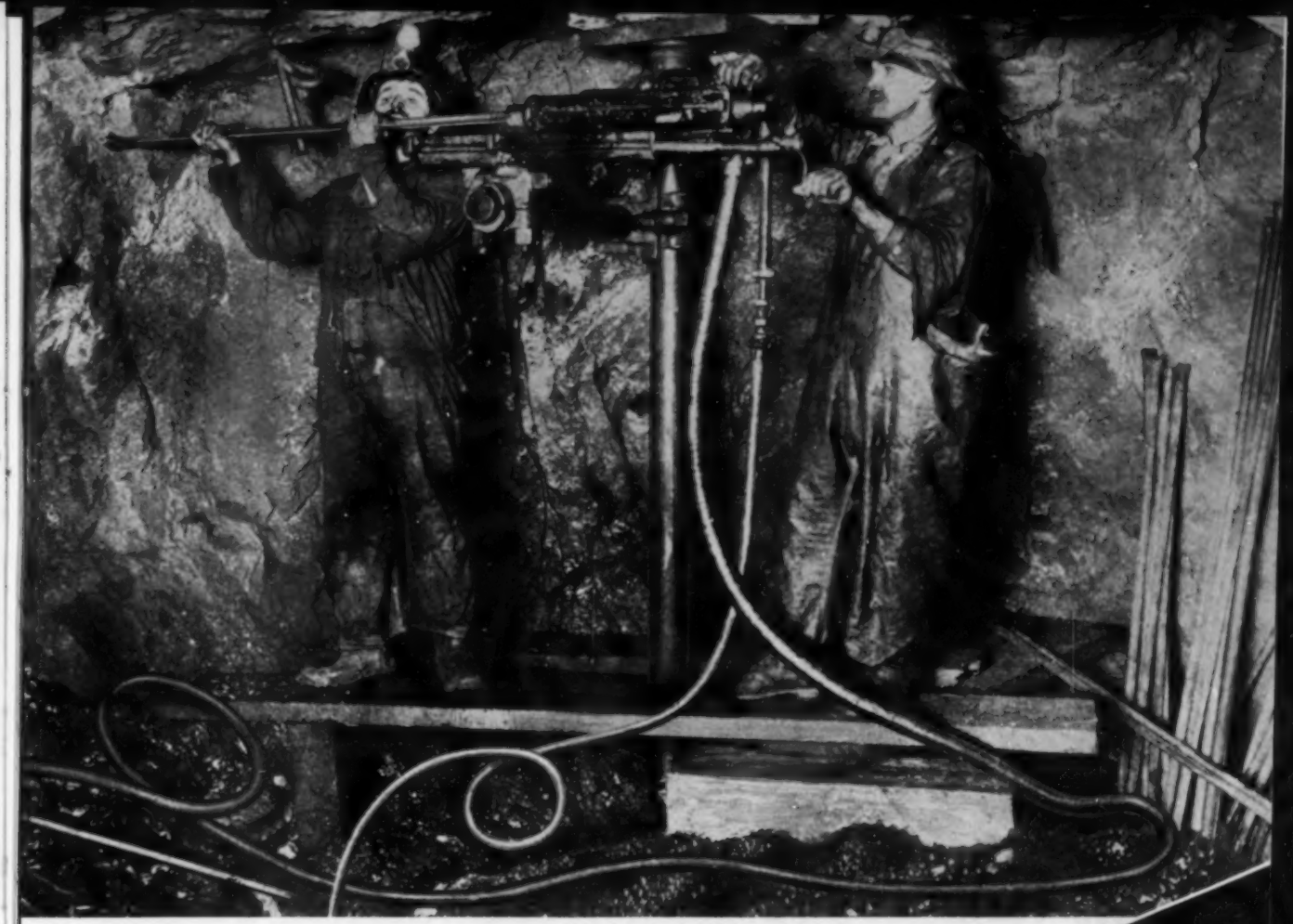
(*Continued on p 138*)

Truax-Traer Honors Mine Personnel for Safety Records

MEN AND OFFICIALS of two mines of the West Virginia Div. of the Truax-Traer Coal Co. were guests of the company at separate dinners held in their honor in September. During the ceremonies, USBM officials presented Joseph A. Holmes Certificates to the Acme mine for mining 1,292,966 tons without a fatality, and to Raccoon-Five Block mine for 1,268,504 fatality-free tons.

At the Acme dinner (left photo), W. A. Haly (standing), USBM, Mt. Hope, W. Va., was the speaker of the evening and presented the Certificate to Lawrence Hill, former Acme superintendent, who in turn presented it to Sam Kraft, present superintendent, and the men. Mr. Haley was introduced by H. M. Tibbs (left), general manager, and M. H. Shumate (right), assistant general manager, served as master of ceremonies. Other speakers included Julius Olzer, inspector-at-large, W. Va. Mines Dept.

Frank Barlow (right, in right photo), 5-Block superintendent, accepted the Certificate in behalf of the men from Carl Kanzala, USBM, Mt. Hope, as Mr. Shumate looked on. Other speakers included Bernice M. Booker, director of accident prevention, W. Va. Dept. of Mines, and J. B. Benson, director of safety, Southern Coal Producers' Association.



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THERMOFLEX Mandrel-built air hose for extreme service and direct connection to compressors. Smooth, black, abrasion-resistant cover.

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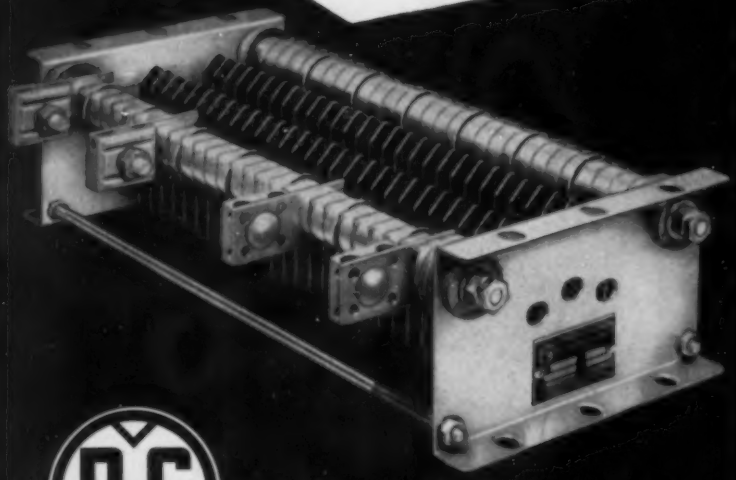

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MEETINGS

Kentucky Mining Institute: Annual Meeting, Nov. 11-12, Phoenix Hotel, Lexington, Ky.

Illinois Mining Institute: Annual Meeting, Nov. 12, Hotel Abraham Lincoln, Springfield, Ill.

National Coal Association: Annual Meeting, Nov. 17-18, Hotel William Penn, Pittsburgh, Pa.

Coal Exporters' Association of U. S., Inc.: Annual Meeting, Nov. 17, Hotel William Penn, Pittsburgh, Pa., in conjunction with NCA Convention.

AMC, Coal Div.: Meeting, Nov. 18, Hotel William Penn, Pittsburgh, Pa.

ASME: Annual Meeting, Nov. 28-Dec. 3, Hotel Statler, New York City.

21st National Power Show, Under the Auspices of the ASME: Dec. 2-7, Commercial Museum, Philadelphia.

National Mine Rescue Association: Annual Meeting, Dec. 8, Hotel William Penn, Pittsburgh, Pa.

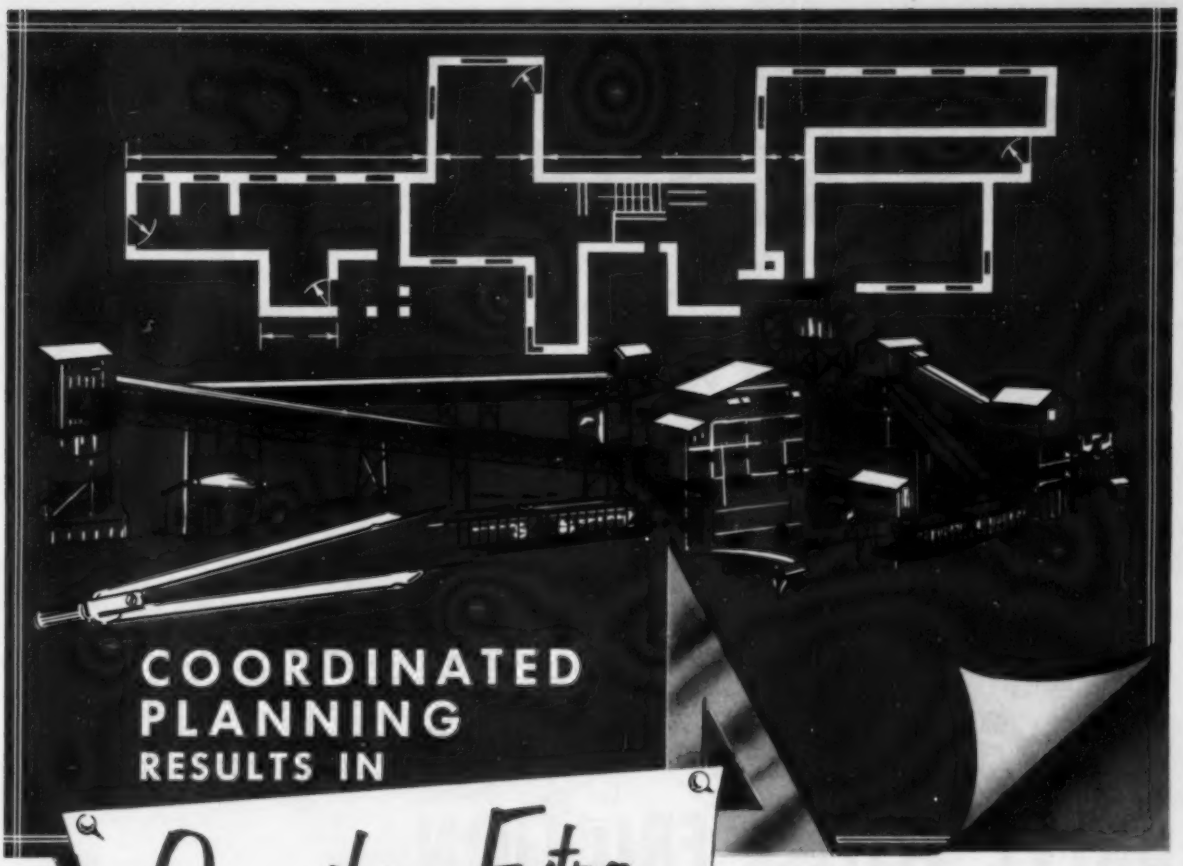
Coal Mining Institute of America: 68th Annual Meeting, Dec. 9-10, Hotel William Penn, Pittsburgh, Pa.

Altvater, vice president—sales, Pittsburgh & Shawmut Coal Co., Kittanning, Pa.

Speakers at the afternoon session were: W. G. Montgomery, sales engineer, Jeffrey Mfg. Co., Pittsburgh, Pa., on mechanized highwall mining; Irvin Graybill Jr., attorney, Pennsylvania Dept. of Revenue, Harrisburg, on sales-tax considerations affecting coal operators; Lester P. Barlow, president, Glmite Corp., Stamford, Conn., on the use of liquid-oxygen explosives in highwall blasting, and Robert J. Trace, deputy attorney general, Commonwealth of Pennsylvania, Harrisburg, on the policies of the Sanitary Water Board. F. H. Mohney, secretary-treasurer, Mineral Producers' Association, Kittanning, presided.

From 16 to 22 in per min is the forward advance of a Colmol now being used in highwall mining in western Pennsylvania, Mr. Montgomery said, in describing an operation employing Molveyor transportation to serve the Colmol. The Colmol-Molveyor combination may be applied in rather narrow pits because right angle turns can be made from the pit into the coal, with Molveyor sections tracking each other around the turn. In an oral and motion-picture presentation, Mr. Montgomery described an active highwall operation in which the Colmol may be able to penetrate to a distance of 1,000 ft under the highwall, followed by Molveyor sections which in turn feed an elevating conveyor at the truck-loading point. Coal ribs between openings are from 2 to 3 ft thick, and openings are started under the protection of a steel canopy to prevent accidents resulting from highwall slides, Mr. Montgomery said. (A detailed description of this type of highwall mining appears in *Coal Age*, January, 1954, p 64.)

"Seek competent legal advice" was Mr.



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For more than half a century Fairmont Machinery Company has been producing coal handling and preparation plants with "Something Extra"! "Something Extra" which is the direct result of painstaking coordinated planning plus responsibility. Here, then, are the reasons why a coal preparation plant by Fairmont is a model of top operating economy and notably increased separating efficiency—both of which lead to the upgrading of your product . . . a vital factor in pleasing today's discriminating coal buyers.

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If you have a knotty preparation problem—if you want a plant which will turn out a guaranteed uniform product and give you over 99% separating efficiency through a product size range of ⅛" to 10" in any tonnage capacity—

Call A FAIRMONT engineer.

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DESIGNERS AND CONSTRUCTORS OF COMPLETE COAL PREPARATION PLANTS USING BOTH WET AND DRY CLEANING, CENTRIFUGAL AND THERMAL DRYING.

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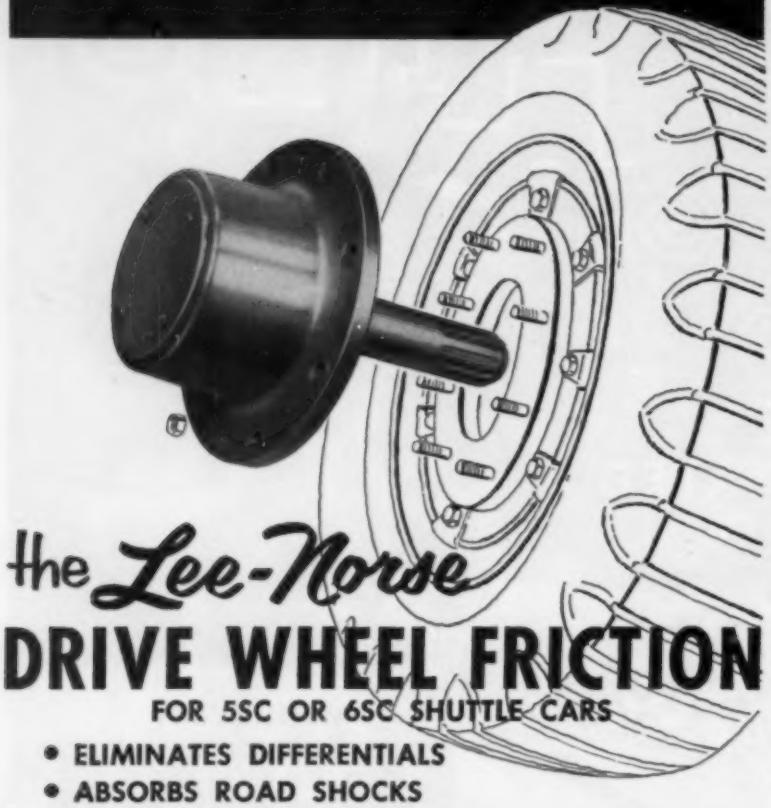

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FOR 5SC OR 6SC SHUTTLE CARS

- ELIMINATES DIFFERENTIALS
- ABSORBS ROAD SHOCKS
- PROTECTS ALL DRIVE PARTS

DESIGNED TO SAVE YOU MONEY in unnecessary repair bills, the LEE-NORSE DRIVE WHEEL FRICTION gives you valuable protection where you need it most . . . all drive parts are protected from destructive loads.

PREVENTS DAMAGE. A new principle of operation prevents damage to the drive by limiting the torque that can be delivered to each wheel within the safe operating range of its driving parts. Destructive road shock is absorbed by the adjustable spring-loaded multiple disc friction. In operation the shuttle car has four-wheel drive with independent wheel action at all times—**without** a differential. The differential may be completely eliminated.

EASY TO INSTALL. The present drive flange and shaft are removed from each wheel and the drive wheel friction is simply bolted in their place. Conversion is quick . . . easy . . . inexpensive.

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Graybill's advice to coal operators who may be uncertain as to the applications of the sales-tax law and the rulings of the tax commission. In clarifying some of these considerations, Mr. Graybill explained that capital equipment cannot be purchased tax-free from a registered equipment seller, although it may be so purchased from another owner and operator. Furthermore, if such equipment is purchased out-of-state, the Pennsylvania purchaser must pay a use tax. Exemption may be granted for those items and supplies which are substantially consumed in the production process. Spare parts for machines are an example.

In the matter of equipment rental, Mr. Graybill pointed out that if the rental results in substantial consumption of the equipment by the lessee then the rental is taxable, and any rental with an option to purchase is taxable.

One of the major problems so far encountered in the administration of the act, Mr. Graybill said, is lack of understanding concerning registration as sellers and consequent confusion concerning the commission's exempetion policies. Coal producers should seek competent advice in these matters.

Safe, efficient overburden blasting with Glmite, a liquid oxygen-carbon explosive, is feasible as a result of advances in LOX technology, Mr. Barlow explained, in reporting that it now is possible to chemically inhibit the explosibility of the mixture while holes are being charged, tamped and connected. A lapse of 6 hr between the times of charging and detonating the holes materially increases safety, since this length of time is required for the inhibiting effects of the chemical to wear off.

This development also permits direct casting of the liquid oxygen-carbon mixture in the blasthole, thus eliminating any need for bags and the necessary filling and soaking. A new source of carbon, the lignite deposits of North Dakota, is practically unlimited, Mr. Barlow stated, in reporting that Glmite soon will be available in quantity.

Mr. Barlow's presentation also included the showing of a film which recorded an experimental shot at Pilotac taconite mine of the Oliver Iron Mining Div., U. S. Steel Co., Iron Mountain, Minn. In spite of the hardness of the taconite formations, the powder factor at time of detonation was 0.86 lb per cubic yard of broken rock, Mr. Barlow reported. Nine holes in two rows were detonated through Primacord with MS connectors between rows. The 9-in holes were 20 ft deep to grade and hole spacing was 20 x 24 ft. Excellent fragmentation was achieved in the resulting 7,714 cu yd of broken rock, Mr. Barlow said. The Glmite organization now is endeavoring to schedule a similar demonstration in western Pennsylvania next Spring.

Acid mine water is the greatest despoiler of Pennsylvania's streams, Mr. Trace declared, and the only practical field solution appears to be the adequate dilution of acid water with sufficient quantities of non-acid water. In administering the clean-streams law, Mr. Trace explained, it has been necessary to for-

12 years of the right oil keeps air compressor . . . .

■ Keeping this air-compressor trouble-free and always on the job is a "must" at General Chemical's fluorspar mine located near Boulder, Colorado. Under rough conditions of fluctuating loads the compressor supplies air for air tools, rock drills, slushers and other vital mining tools.

Constant operation calls for an oil that will keep wear to a minimum . . . and assure trouble-free compressor out-put to keep these tools working.

In a recent twelve year stretch, STANOIL #31 was the oil relied on to keep this unit on the job.

At the end of this period the engine was taken down for inspection. With this hard-working oil assuring day-in day-out protection these were the findings. There were no carbon deposits and no cylinder wear. Protection had been so thorough that the rings showed *no signs of wear whatsoever!* In fact, they were in such like-new condition that they were put back into use!

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New West Virginia expansion sleeve roof bolts are designed for quicker tightening, increased holding power. Deeper, angular teeth have larger biting area. Shell finger extension over bolt end provides initial anchorage without the use of ears or pal nuts on bolt; permits plug to be pulled down, expanding flexible fingers. These advantages make bolting a safer, faster part of mining cycle.

Wedge-type or expansion sleeve roof bolts available in all lengths. Threads waterproof-wrapped and spray-protected from rust. Write for latest roof bolting literature.

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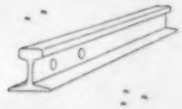

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Easy to handle, ready to install, may be used and reused. Made to suit any rail and gauge of track.

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Big Hoister

DESIGNED for a capacity of 1,200 tph, this main slope conveyor serves the new No. 10 all-belt all-mechanical mine of the Peabody Coal Co., at Pana, Ill., currently producing 14,500 tons per two-shift day. Slope inclination is 16 deg., conveyor length is 1,729 ft, and total vertical lift is 475 ft. To handle its assignment, the conveyor is equipped with a modified dual-tandem drive powered through speed reducers by three 250-hp motors.

In presenting the story of Peabody No. 10 in the September, 1954, issue of *Coal Age*, pp 80-96, the maker of this slope conveyor was incorrectly reported. The conveyor was supplied by the Robins Conveyors Div. of Hewitt-Robins, Inc., Passaic, N. J.

mulate within the Sanitary Water Board certain policies which recognize the economic importance of the mining industry while rehabilitating the waterways of the Commonwealth. The board is not opposed to mining, but it must exercise some measure of control if it is to fulfill the intent of the legislature in passing the clean streams law.

Mr. Trace suggested that mine operators, in applying for permits, describe the limits of their mining precisely and clearly explain their plans for handling their drainage. Good planning in the pre-application period will eliminate many of the troubles now encountered when operators find that their present permit does not cover the entire property. Another shortcoming is the apparent reluctance of some coal operators to answer correspondence of the Sanitary Water Board, thus complicating the administrative tasks of the group, Mr. Trace said.

USE THE CABLE THAT FITS THE JOB!

Toughness is an absolute requirement for long, uninterrupted service life in mining cables that are subjected to the severest of all operating conditions. Hazacord's Hazaprene ZBF sheath is designed to provide the greatest possible mechanical protection while maintaining the flexibility required by highly mobile equipment.

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These pumps maintain nearly normal capacity under any working head and require very low headroom. Ideal for remote locations, as they require little or no attention.

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Gorman-Rupp self-priming centrifugal pumps will handle the toughest jobs. They **prime faster, higher,** and will pump **more dirty water** than any other pump of comparable size. Made in all sizes from 1½ inch 5500 G.P.H., to the powerful 10 inch, 240,000 G.P.H.

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Thomas A. Edison Honored

AS THE UNITED STATES last month marked the 75th anniversary of Thomas A. Edison's invention of the first practical incandescent lamp, coal and metal miners throughout the world also paid homage to the great inventor for another of his discoveries, the first safe cap lamp which eliminated the principal cause of disastrous mine fires and explosions underground. Until Edison's cap lamp for miners was introduced in 1915, the death toll from mine fires and explosions was staggering. In the 5-yr period, from 1906 to 1910, for example, an average of 2,657 U.S. miners were killed annually by accidents underground.

Edison began his work on a battery-powered electric cap lamp for miners in 1912. He later described it as "his most humanitarian invention," because it replaced the hazardous open flame lamps.

Shortly after the USBM approved the Edison Lamp in 1915, the first installation was made at a mine in Carlisle, W. Va., where 22 miners had been killed by an explosion a few days before. The installation was engineered by George H. Deike, now chairman of the board of Mine Safety Appliances Co., world distributors of Edison miners' lamps for Thomas A. Edison, Inc., since their invention. The present model has 100 times more illuminating intensity than the first model, MSA officials point out in citing progress of the last 40 yr.

Big Sandy-Elkhorn Group Picks Star Aid Team

Selection of an "All-Star" first aid team to demonstrate in coal-producing areas was an innovation at the annual safety day of the Big Sandy-Elkhorn Coal Mining Institute, held Sept. 25 at Pikeville, Ky. A team from the Turner Elkhorn Mining Co., Drift, Ky., captained by Edward Robinson, won first place in the white men's first aid competition.

In the first aid contest, colored division, the Wheelwright team of the Inland Steel Co., captained by John T. Miller, took top place. The mine rescue contest was won by the Hendrix mine team of Consolidation Coal Co. (Ky.), captained by Douglas Damron. In both

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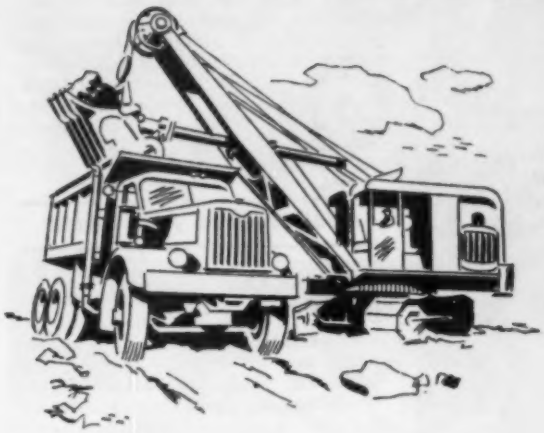

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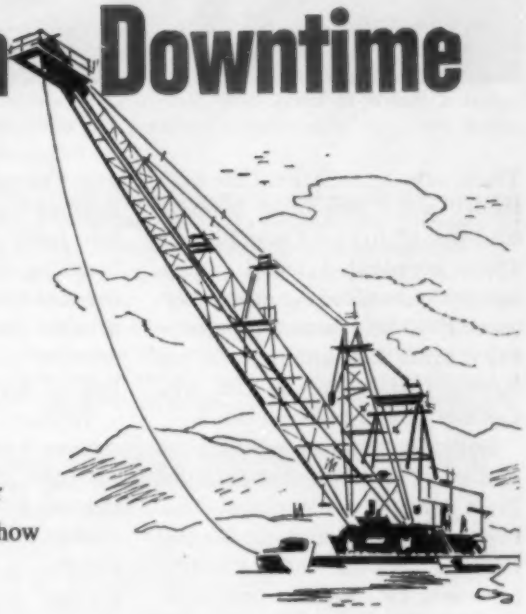
Sinclair TENOL® kept a Diesel-powered Shovel in top operating condition 10,000 hours without overhaul.

No Lubrication Downtime in Two Years!



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● Wherever wheels turn or friction must be lessened, a Sinclair lubricant can improve your operations. Your Sinclair Representative will show you where and how. Write or phone him, or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

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Armco Liner Plates Make Short Work of TALL BINS

You'll save installation time and money when you build storage facilities of Armco Liner Plates. These corrugated metal plates are easily handled—and readily assembled into sturdy, permanent bins. Workmen need no special training to do the job. Ordinary hand tools are used.

Individual plates are bolted together where they overlap to form 18-inch wide rings. The rings are connected along flanged edges. Plates are not too heavy for one or two men to carry, hold and bolt in place.

Armco Liner Plates are available in a wide range of sizes and gages to meet specific needs. The finished bin is fire-resistant and free from danger of cracking or breaking. And should your needs for storage change, you can dismantle the structure and re-erect it on a new site without loss of materials.

Write us for complete data on Armco Liner Plates and their other money-saving uses in shafts, mine entries and overcasts. Armco Drainage & Metal Products, Inc., 4064 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

ARMCO LINER PLATES ARMCO

the boys and girls first aid competitions, teams entered by the Princess Elkhorn Coal Co. were winners.

The All-Star team, elected by members of each competing team, will be uniformed by the Big Sandy-Elkhorn Coal Operators' Association. Its members are: Edward F. Robinson, Turner Elkhorn Mining Co.; Roy Conley, Luther Hall and Elmer Caudill, Wheelwright mine, Inland Steel Co.; Raymond Wetzel, Hendrix mine, Consolidation Coal Co. (Ky.); and Fred Mollett, Princess Elkhorn Coal Co. Named alternates were: Estill Cox, Hendrix mine, Consolidation Coal Co. (Ky.); Roy Hicks, Turner Elkhorn Mining Co.; and Howard Hamilton, Princess Elkhorn Coal Co.

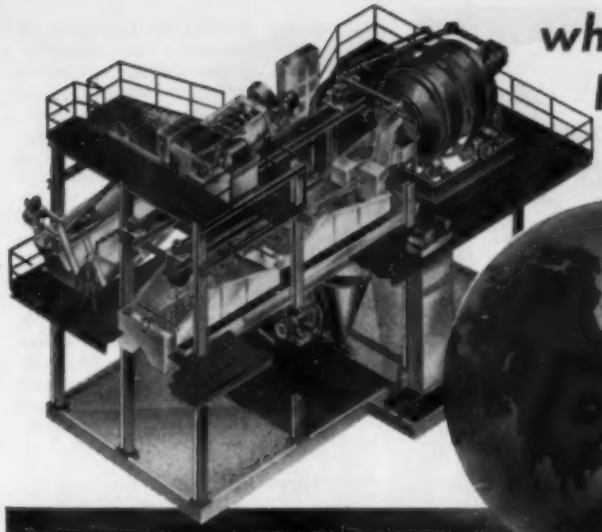
Association Activities

Kanawha Coal Operators Celebrate 50th Year

The Kanawha Coal Operators' Association held its 50th Anniversary meeting Oct. 21 at the Kanawha Country Club, Charleston, W. Va. Officers elected for the new year were: president, L. Newton Thomas, president, Carbon Fuel Co.; vice president, J. S. Conley, president, Wyatt Coal Co.; and Harry G. Kennedy, re-elected executive secretary. Both the business session and the banquet were well attended. With Mr. Thomas presiding, speakers offered reports from various organizations as follows: smoke abatement, H. B. Lammers; stream pollution, Henry Hebley; the West Virginia Coal Association, Carl Andrews; Southern Coal Producers' Association, Joseph E. Moody; Property Owners' Committee dealing with freight rates, W. M. Maddox; National Coal Association, John D. Battle; legal matters, R. G. Kelly, association counsel; and general conditions, Mr. Kennedy. Minutes were read from the organization meeting 50 yr ago, and from them it appears that the conditions confronting the coal industry at that time are still present, with problems not too different from what they are now. About 100 members, their associates and friends attended the banquet where R. G. Kelly acted as toastmaster and brief remarks were made by Messrs. Moody and Battle. Harry G. Kennedy, the executive secretary, celebrated his 10th anniversary in that office.

Stoker Mfgs. Hold Meeting; Plan Continuing Program

The Stoker Manufacturers' Association, at its annual meeting in Chicago, Oct. 15, re-elected L. C. Dubs, president of the Canton Stoker Corp., president of the association for the third consecutive term. R. F. Young, manager, Heating Div., Auburn Foundry, Inc., was elected vice president, succeeding B. O. Fink, deceased, former president of Auburn Foundry, Inc. E. J. Worley, president, Worley Equipment, Inc., was elected secretary-treasurer, and all incumbent directors were re-elected for another term. The major part of the business



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Wemco's extensive engineering and equipment experience is your assurance of our ability to design and install complete custom built preparation plants.

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Anthracite and bituminous coal rank first in tonnage among materials now being economically produced by Mobil-Mills. Wemco Mobil-Mills provide accurate control over coal washing with the necessary flexibility for efficient cleaning of a wide range of sizes and grades. More and more coal operators are using Mobil-Mill cleaning to assure a high yield of clean coal—the kind that always finds a steady demand. You, too, will find it profitable to learn more about the Wemco Mobil-Mill.

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- **Fast installation at the plant site.**
- **Minimum initial and operating costs.**
- **Clean, sharp separation with high yield.**

Mobil-Mills are furnished in five basic sizes and several models with smaller or larger plants varying in capacity from 25 to 420 TPH. Each plant is equipped with a choice of one of the following type separators:

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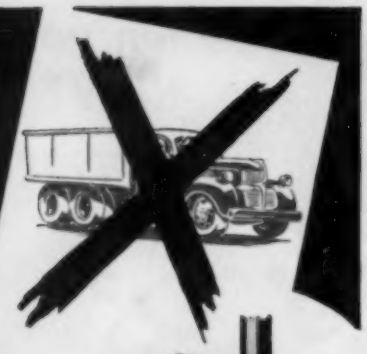

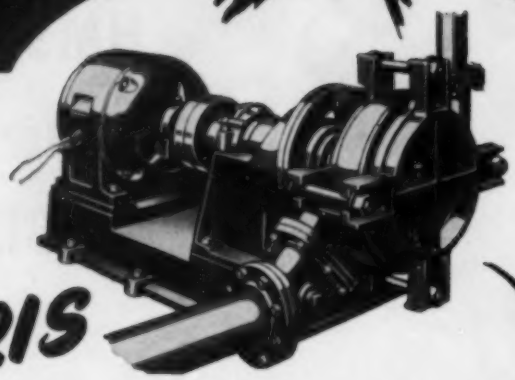

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In coal washeries and processing plants, Morris Pumps have been saving coal operators thousands of dollars in waste disposal operations. They eliminate expensive truck maintenance . . . trucking labor . . . and in many cases, they eliminate the building of roads for trucks to travel.

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Morris furnishes pumps of various types depending upon the operating conditions . . . type of refuse to be handled . . . static discharge head . . . length of pipe line through which refuse is discharged.

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Morris Pumps are ideally suited to the removal of fine silt and other types of refuse. They're easy to install . . . easy to maintain . . . easy to dismantle.

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sessions was devoted to discussions of problems of competitive fuels, manufacturing costs, and distribution and selling methods. Following a review of the past year's activities, a decision was unanimously made to continue all the organization's normal functions, though on a somewhat reduced scale, and to maintain as high a standard of service to the industry as is consistent with the volume of business of those manufacturers who are still active in stoker sales and merchandising promotion. Speakers at the luncheon included B. R. Gebhart, vice president, Chicago, Wilmington & Franklin Coal Co., and chairman of the NCA Subcommittee on Sales Engineering Service; Walter J. Scherer, president, American Retail Coal Association; and J. Nelson Stuart, manager, NCA Market Promotion Dept.

Pennsylvania Group Elects

Dennis J. Keenan, general superintendent, Sterling Coal Co., Barnesboro, Pa., has been re-elected president of the North Cambria Coal Mining Institute. Also re-elected were George Resnick, vice president; Joseph Cole, secretary; and William Todhunter, treasurer.

New Books for Coal Men

Coal Standards Updated

ASTM Standards on Coal and Coke, 1954 edition. Twenty-seven methods of test; definitions and specifications for coal and coke are set forth in this new edition, which includes revised data relating to air pollution. The volume is especially useful to quantity buyers of coal such as electric utilities, gas and coke manufacturers and government agencies. *155 pp. 6x9-in; paper. $1.70 to ASTM members; $2.25 to others. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.*

New Data on Accidents

Accident Facts, 1954. This new edition of National Safety Council's statistical yearbook shows trends during the past 25 yr and lists accident rates by major industrial groups. The book devotes 20 pp to occupational accidents and outlines a preventive program. *96 pp. Single copies, 75c; quantity prices on request. National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

Giving Better Orders

You Can Give Orders That Get Action! This little booklet, well illustrated in two colors, gives suggestions for supervisors in telling workers what is wanted. *22 pp. 4¼x6½-in; paper. 25c. National Foremen's Institute, New London, Conn.*

Practical Welding

Welding for Engineers, by Harry Udin, E. R. Funk and John Wulff. Here's a clear presentation of the basic principles and practice of welding engineering with a practical, analytical approach. *430 pp. 5½x8½-in; cloth. $7.50. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y.*

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6. **MAINTAIN QUALITY**—Permatreat reduces deterioration from weathering
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8. **CONTROL BULK DENSITY**—Permatreat insures uniform coke production and quality

Coal treated with . . .

Ashland
PERMATREAT
COAL SPRAY
seals in dust

"lasts the life of the coal"

Interested? Write, wire or phone

ASHLAND OIL & REFINING COMPANY
Ashland, Kentucky

Special Advisory Service available from nationally recognized authorities on coal treatment.

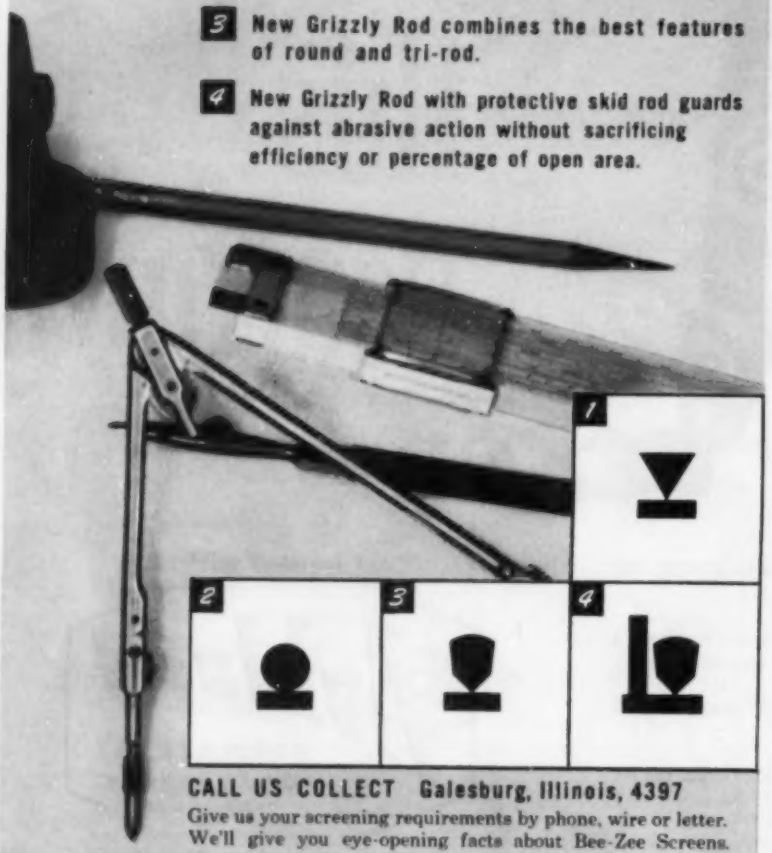
BEE-ZEE SCREENS...

proved and improved!

More accurate sizing, sharper separation and more complete deliquefying make Bee-Zee Screens famous. Over the years, praises and re-orders poured into Galesburg. Bee-Zee quality was proved again and again...but not to Bee-Zee engineers!

Bee-Zee engineers know that your customers can well afford to be hair-splittingly choosey...that your product faces stiff competition every day...that you *must* produce quality and still greater quality to make sales. So new specialized shapes were created. (See them below.) They *make you money* like never before!

1. Tri-Rod for knife-like separation.
2. Round Rod for long-lived accuracy.
3. New Grizzly Rod combines the best features of round and tri-rod.
4. New Grizzly Rod with protective skid rod guards against abrasive action without sacrificing efficiency or percentage of open area.



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Give us your screening requirements by phone, wire or letter. We'll give you eye-opening facts about Bee-Zee Screens.

Bee-Zee Screens are precision spot-welded of stainless steel...can be fitted to any screening equipment...with supporting rods spaced for best performance.

BIXBY-ZIMMER *Engineering Co.*

1114 Abingdon Street, Galesburg, Illinois

NEWS BRIEFS . . . From p 129

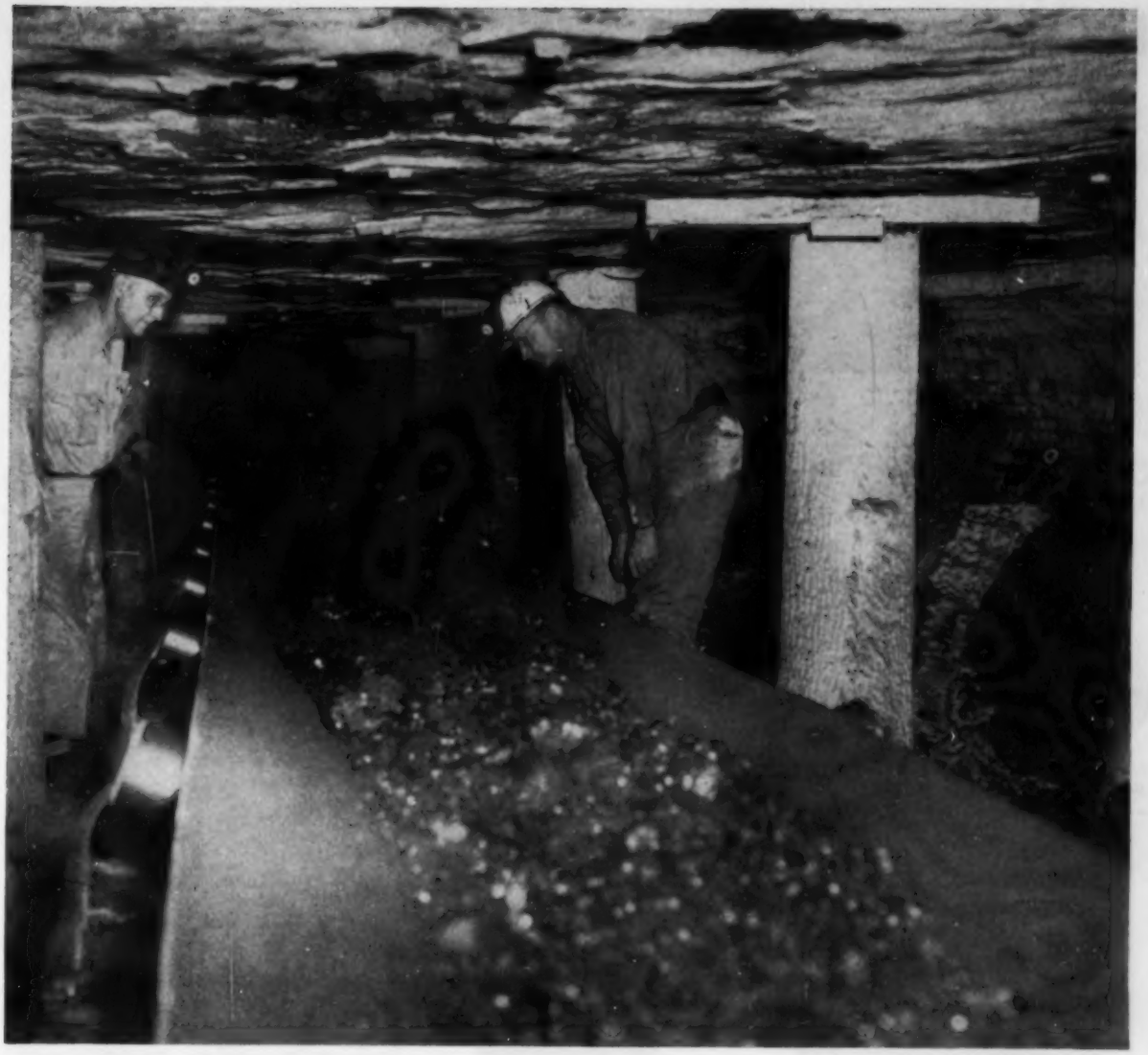
on Oct. 5, a train hauling scrap metal from the demolished bridge was harassed by rifle shots. On Oct. 9, two shovels and a dragline at the Rich-Sewell Coal & Coke Co., a Maust stripping, were blasted, with damage estimated at $100,000, after guards were driven from the area by rifle fire. The dynamiting of a highway bridge leading to one mine and unsuccessful attempts to dynamite another highway bridge and a Maust-owned truck also have been reported. Earlier, at a preliminary hearing in Richwood, W. Va., Sept. 30, six men were held for grand jury action and five others released in connection with the severe beating Sept. 8 of B. J. Short, independent mine operator, who leases his property from the Maust organization.

Pennsylvania "Wildcat" Idles 10,500 Miners

A week-long "wildcat" stoppage that closed 15 mines in southwestern Pennsylvania ended Oct. 15 as miners began returning to work under an agreement turning their dispute over to the regular grievance machinery. Reportedly growing out of an intraunion fight revolving around a seniority issue, the stoppage closed down eight U. S. Steel mines the first of the week and later was extended by pickets to a ninth U. S. Steel mine and six other mines. Some 10,500 miners were idled, with production of more than 70,000 tons of coal daily shut off. The men started back after a 3-man UMWA commission appointed by John L. Lewis to investigate the controversy guaranteed that the dispute would be settled with the company. Earlier, in September, miners at U. S. Steel's Robena mine stayed out for a week, charging that uncertified shotfirers were working, and returned to work only after a state mine inspector arranged for discussion with the company.

Island Creek Takes Over Cleveland-Cliffs Coal Div.

The Cleveland-Cliffs Iron Co. and the Island Creek Coal Co. announced Oct. 20 the sale of Cliffs' coal-marketing division and the Duluth and Port Huron docks to Island Creek, and through it the sale of the Green Bay (Wis.) dock and Cliffs' interest in the Escanaba Coal & Dock Co. to the C. Reiss Coal Co., Sheboygan, Wis. Cleveland-Cliffs coal division markets some 4,000,000 tons yearly, acting as distributor of coals from six states and as exclusive sales agents for several producing companies. Its coal sales, district offices and much of its personnel are to be integrated into the Island Creek Coal Sales Co. Marketing coals of a different character and variety mainly, Island Creek has annual sales exceeding 8,000,000 tons. The transaction, Island Creek President R. E. Salvati pointed out, is "another step in Island Creek's concrete demonstration of faith in the coal industry's future—and in its own potential for growth and success for a second 50 yr" of operation.



NEOPRENE FEEDER BELT AT TRUAX-TRAER COAL CO., United No. 1 Mine, Kayford, W. Va., carries 350 tons per shift between the working face and mother conveyor. Company management have come to expect long life from neoprene conveyor belting because neoprene has the rugged endurance needed to take the punishing impact and grinding action of the coal. And, in addition, neoprene is flame-resistant. It won't support combustion . . . provides greater safety in the mine. The result is long service life, big savings on replacement, and extra dividends in safety. Next time you order conveyor belting, specify neoprene—the same tough material used to jacket mine trailing cable. Neoprene offers you outstanding ***resistance to abrasion, fire, aging, oil and grease.*** Keep abreast of the latest neoprene developments . . . mail the coupon below today!

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The rubber made by Du Pont since 1932

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For just the right size—call on Hendrick

Hendrick Perforated Plate used on vibrating and shaking screens can often mean the difference between profit and loss in coal preparation. With Hendrick Perforated Metal Plate, screens enjoy longer service life and openings remain uniform even under constant, heavy-duty usage. And you can rest assured materials will be accurately sized!

When Hendrick Perforated Plate is specified delays due to blinding can be reduced to a minimum—decks can be changed in less time—and downtime can be practically eliminated.

For the flat, corrugated or stepped shape and size of perforation you specifically need to cut costs best, write Hendrick direct.

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PERFORATED METAL • PERFORATED METAL SCREENS • WEDGE-SLOT SCREENS
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FACTORY SET, TAMPER-PROOF TIMING

Practically non-breakable, Durakool Factory Set Timer Relays have more than proved themselves on the roughest and toughest jobs that could be found. Year by year, their use increases in sensational fashion.

Controlled time available from .15 to 20.0 seconds in either normally open or normally closed actions. No waiting. Your production schedule is met.

See telephone directory for local distributor or write for Bulletin 600

★ No false contacts
★ No chatter
★ Quiet in operation
★ Low in cost

DURAKOOL, INC., Elkhart, Indiana
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Durakool ALL-STEEL MERCURY *Timers*

Companies Report Earnings

Eastern Gas & Fuel Associates—Year to Sept. 30, 1954, consolidated net income of $2,738,560, or 62c per common share, on operating revenue of $125,605,672; against a net of $4,119,711, or $1.16 a share, on revenue of $147,830,751 for the previous fiscal year.

Pittsburgh Consolidation Coal Co.—3 mo to Sept. 30, 1954, net income of $2,436,611, or $1.13 per share; compared with a net of $3,126,551, or $1.45 a share, for the same period of 1953.

United Electric Coal Cos.—Year to July 31, 1954, net income of $706,182, or $1.04 a share, on net sales of $13,000,509; compared with net of $1,407,562, or $2.08 a share, on net sales of $14,742,135 for the 1953 fiscal year.

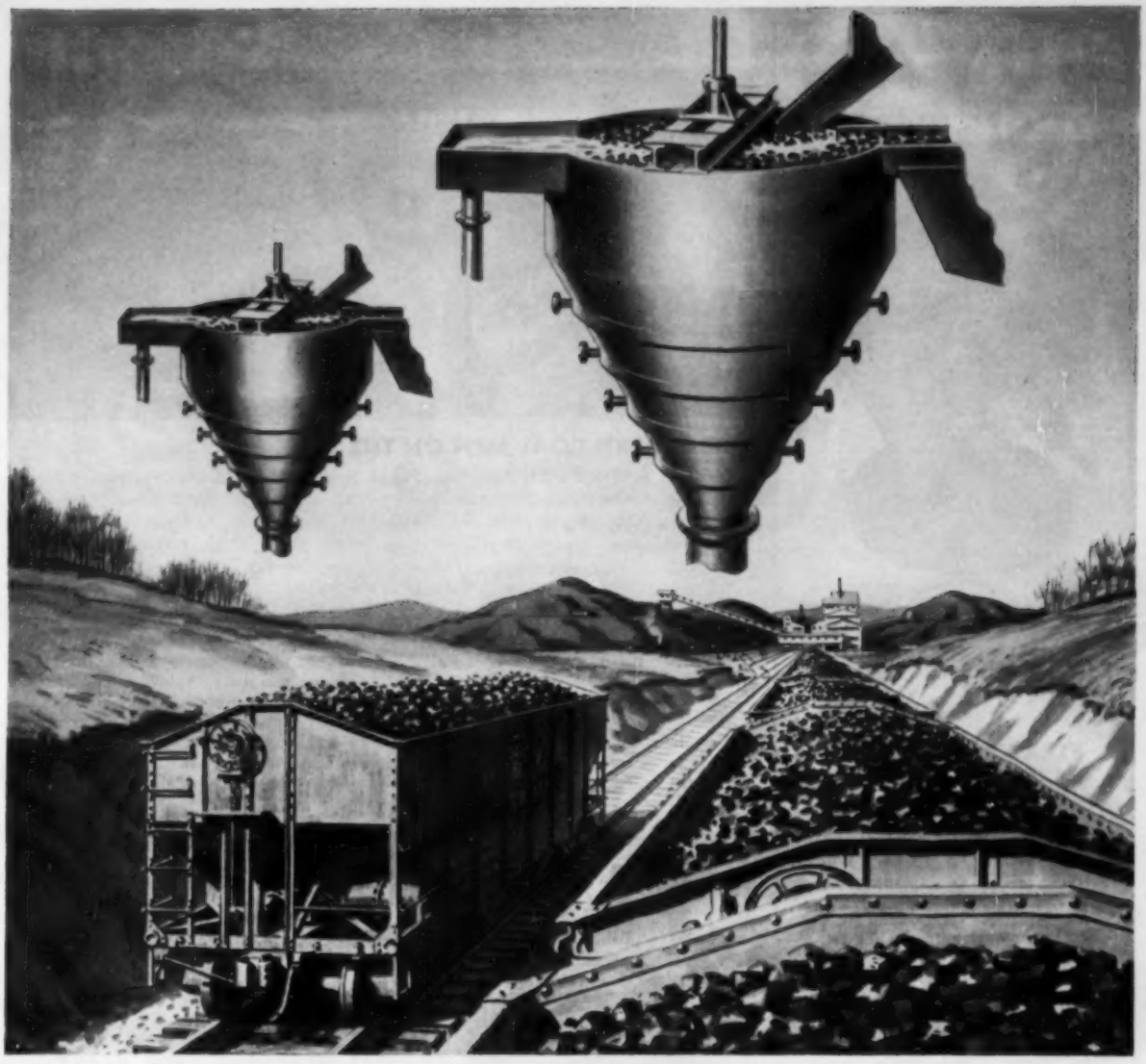
West Virginia Coal & Coke Corp.—9 mo to Sept. 30, 1954, net loss of $71,971, compared to net income of $422,342, or 84c a share, for the first 9 mo of 1953.

Colorado Group Promotes Coal For Use at New Air Academy

A novel and impressive means of promoting the use of Colorado coal at the Air Academy to be located at Colorado Springs is being used by the coal industry. It is a 6-p, 2-color illustrated brochure incorporating a letter to Harold E. Talbott, Secretary of the Air Force, pointing out the availability, quality, and economy of Colorado coal. Signed by W. G. Joyce, western sales manager, Pittsburgh & Midway Coal Mining Co., as chairman of the Colorado Coal Committee, the letter includes a fuel-cost comparison showing coal's estimated annual cost to be approximately $33,800 under the price of coal's equivalent in natural gas, and of $71,000 under the cost of No. 5 fuel oil. The letter refers to a Defense Dept. memorandum to heads of military establishments dated Feb. 17, 1951, which declared "Coal is the nation's largest fuel resource," and that "It should be employed, as far as practicable, at all military facilities." The brochure was published by the Colorado & New Mexico Coal Operators' Association, Western Coal Producers' Association, Colorado Legislative Committee on Fuels, Northern Colorado Coals, Inc., Colorado State Coal Mine Inspection Dept., and National Coal Association. Serving with Mr. Joyce on the committee are Jack Rundell, general manager, Pikes Peak Fuel Div., Golden Cycle Corp., Colorado Springs; O. F. Bridwell, secretary-treasurer, Northern Colorado Coals, Inc., Denver; and C. A. Reed, director, NCA Engineering Dept.

Gas Industry Planning Large Expansion, Convention Told

Over $3½ billion will be spent by the Nation's gas utility and pipe-line industry for construction and expansion in the next 4 yr and 90% of it will go into natural-gas systems, the annual convention of the American Gas Association meeting in Atlantic City was told Oct. 11. The record expansion was outlined by Earl H. Eacker, retiring association president and president of the Boston Consolidated Gas Co. "Natural gas will



40 TO 600 TPH OF CLEAN COAL

at minimum cost per ton

Small mines, large mines, medium sized mines—the Chance Process offers you the most economical way to get accurately sized, well cleaned coal.

HIGH SEPARATING EFFICIENCY. Close to 100% recovery of saleable coal. Efficiency remains constant because the specific gravity of the mixture does not change with fluctuating feed rates or changing qualities of coal.

EXTREME FLEXIBILITY One washing unit handles coal at gravities ranging from 1.35 to 1.65 and sizes ranging from 10" to ⅛". A change in gravity takes only five minutes, simply requires opening or closing of valves.

LOW COST, DEPENDABLE OPERATION. The Chance Process is known the world over for its low cost, uniform, trouble-free performance. The entire operation requires only one man. The unit is of heavy duty construction . . . has a minimum of moving parts.

Whatever your coal cleaning problem may be, the Chance Process provides the economical answer. Chance Cones are available in a variety of sizes. Our engineers will be glad to discuss your requirements at any time.

THE HEART OF THE PREPARATION PLANT

UNITED ENGINEERS & CONSTRUCTORS INC

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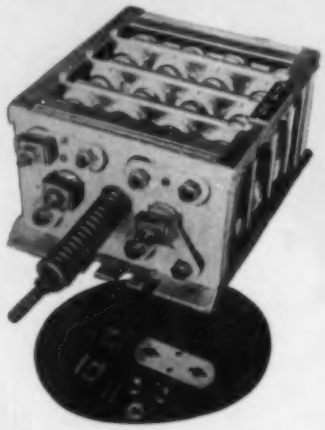
WITH A BACKGROUND OF OVER SEVENTY YEARS' EXPERIENCE

GUYAN RESISTORS



Above is a typical design of all GUYAN RESISTORS including standard boxes and mining equipment resistors.

• • • •

STRATEGIC LOCATION OF GUYAN QUALIFIED DISTRIBUTORS TO COAL MINING INDUSTRY

Athens Armature & Machine Works, Athens, Ohio
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Cambridge Machine & Supply Co., Cambridge, Ohio
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H. A. Holden, Inc., Minneapolis, Minn.
Keith Brokerage, St. Johns, New Brunswick, CANADA
Kentucky Mine Supply Company, Harlan, Ky.
Carl Liam, Wilkes-Barre, Pa.
Mechanical Mining Service Co., Morgantown, W. Va.
Mill & Mine Supply Company, Birmingham, Ala.
Mine Service Co., Lothair, Ky.
R. M. Regan, Middlesboro, Ky.
Service Supply Company, Wheeling, W. Va.
Union Supply Company, Denver, Colo.
Universal Supply Co., Beckley, W. Va.
Wetzel Equipment Co., Salt Lake City, Utah

GUYAN MACHINERY CO.
LOGAN · · · WEST VIRGINIA

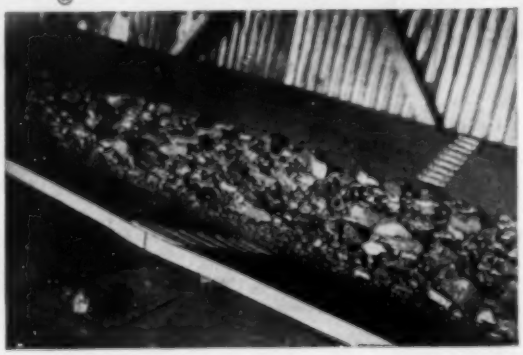
BRAZILIAN COAL MEN ON THE JOB . . .

THREE MINING MEN from Sao Paulo, Brazil, on an inspection tour of North American coal mines, photographed during a visit to the Ensign Electric & Mfg. Co., Huntington, W. Va., some of whose products they use, are: Dr. Ney Webster Araujo (left), civil engineer, Butia mine, CADEM; Dr. J. B. Aquino, mining engineer, FORMAC, S. A.; Darwin A. Ensign, president of Ensign Electric; Dr. Sinval Cirio, chief engineer, Sao Jeronimo mine CADEM.

be brought into new territories, including the Pacific Northwest," he said. "The discovery of great new Canadian gas reserves and the expectation that these reserves will soon be piped to Canadian industrial centers paves the way for a spectacular development of the Canadian gas industry. Additional supplies will go to areas already receiving more than 54 million therms of natural gas being sold annually in the U. S.," he predicted. At the start of the year, proved recoverable reserves of natural gas totaled 212 trillion cu ft, an increase of some 12 trillion cu ft over the previous year, Mr. Eacker reported.

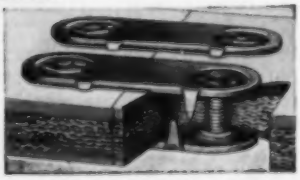
FLEXCO®

BELT FASTENERS and RIP PLATES



FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
★ Distribute pull or tension uniformly.
★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.
★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.



Compression Grip distributes strain over whole plate area

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FLEXIBLE STEEL LACING CO., 4638 Lexington St., Chicago 44, Ill.

How many dimes can YOU save

from every lubrication dollar?

Simplify and Save the Pure Oil way

6-WAY SAVINGS!

1. Simplifies Lubrication
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Be *sure* with Pure—Sales offices located in more than 500 cities in Pure's marketing area.

Now's the time to start tightening up on production and maintenance costs. And the place to start—one place where really dramatic savings often can be made—is on *lubrication*.

Pure Oil multi-purpose lubricants—*the specially-formulated lubricants that do many different jobs equally well*—enable you to make a six-way savings that amount to real money. What's more, your lubrication program becomes *surer*, simpler, more efficient . . . saves time, saves machines, saves money!

For complete information on this cost-cutting program, clip out the coupon and mail it today. It's the first step toward big lubrication savings!

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Please send me your free booklet on how to "Simplify and Save."

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BEARINGS AND
PILLOW BLOCKS

West Virginia Court Refuses Appeal in Strip Mining Case

West Virginia's Supreme Court, by a 4-to-1 decision, refused Oct. 11 to consider an appeal of a Roanoke, Va., coal operator from a lower court decision that barred him from strip mining coal from state forest property. D. S. Blount, doing business as the Cavalier-Peerless Coal Co., had asked the court to review a Taylor County Circuit Court decision of July 13 which prevented him from strip mining coal in Kumbratow State Forest. Mr. Blount had obtained a 10-yr lease to remove coal in March, 1953, and had started to move machinery and mining equipment into the forest when he was halted by the lower court order. He had planned to strip from 45 to 90 acres from a 300,000-ton seam of coal underneath the forest land. Sparked by the State Conservation Dept., the legal controversy centered over language of a 1934 deed through which the state acquired the property, without mineral rights, and which the state contended was not broad enough to permit strip mining.

Field Engineering Plan Set for Campbell Stokers

Automatic Solid Fuels Equipment, Inc., New Albany, Ind., has announced the formation of "Program FES," a field-engineering service designed to aid Campbell Stoker dealers in the correction of major field installation and servicing problems. The plan, instigated by the ASFE Engineering Advisory Board under the auspices of Earl Payne, chairman, began Sept. 24, following a 1-day Campbell training school at BCR laboratories. FES resulted after the advisory board received significant voluntary cooperation from producing companies holding stock in ASFE and the fuel engineers associated with the companies. In operation, these fuel engineers will act as FES representatives in the field, in conjunction with their usual activities, in assisting Campbell dealers who are yet unfamiliar with automatic coal-burning equipment, its operation, installation and servicing. Although most of the field problems are of a minor nature, once dealers become familiar with corrective measures, they will be able to adequately solve other servicing problems stemming from basic sources, it is felt.

Electrocarbonization Expert Forms Research Company

Formation of a new research company, Electrotherm Research Corp., 114 West 11th St., Kansas City, Mo., to specialize in the electrotherm process of oil recovery from depleted fields and the underground electrocarbonization of coal was announced last month by Dr. Erich Sarapuu, former director of research, Sinclair Coal Co. The patented electrotherm process is based on the use of high-voltage electric energy for heating the oil sands or coal in the underground formation and removing the liquefied and gaseous constituents from hydrocarbon burning materials. Coal seams are

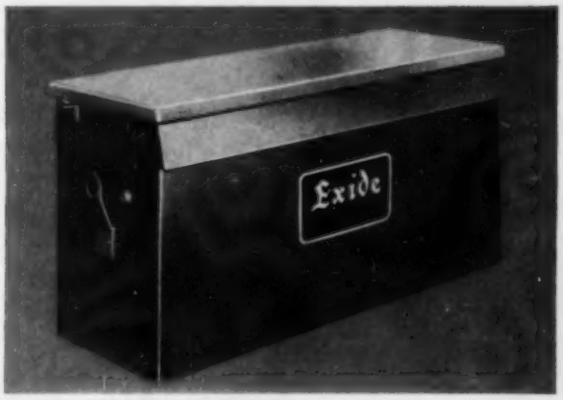
GET LOWER PRODUCTION COSTS, FASTER HAULAGE

...with dependable Exide-Ironclad batteries!

An Exide-Ironclad battery powers this tractor in the new Freeman #4 mine of the Freeman Coal Mining Corporation near Marion, Illinois. Efficient, modern methods have boosted production.

YOU CAN count on Exide-Ironclads to help speed up car changes, keep loaders busy and main line haulage moving fast. This means you get more trips per shift, more production per man-hour with less cost per ton handled. Exide powered equipment will handle as much tonnage during the last hour of the shift as during the first. Lower costs for operation, maintenance and depreciation make Exide-Ironclad batteries your best power buy—AT ANY PRICE!

THE POSITIVE PLATES are the heart of any battery. Only Exide uses a slotted tube construction. By use of tubes, more active material is exposed to the electrolyte, providing *greater power*. Also, more active material is retained, giving *longer working life*.



THE NEW THRIFTY HAULER! The improved shuttle car battery using *Non-oxidizing* plastic power tubes for longest battery life, more capacity in the same space. For full details, call your Exide sales engineer—write for Form 1982 (Installation and Maintenance of Motive Power).

Your best power buy
...AT ANY PRICE!

Exide®
IRONCLAD® BATTERIES

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

THE HEART
of your preparation plant

Successful coal cleaning oftentimes depends upon the proper type of crushing of raw coal, middlings, and refuse. Your crushing equipment is not an auxiliary but is the heart of your preparation plant.

Pennsylvania has specialized in this field and has developed a dependable and accurate method of crusher selection, along with a line of Bradford Breakers, Bradmills, Hammermills, Ring Hammermills, Impactors, Jaws and Single Rolls.

Our engineers welcome the opportunity of working with you on any coal cleaning or sizing problems you have.

Ask us to send you our new catalog of crushers for the coal mining industry, Bulletin No. 4010. Pennsylvania Crusher Company (division of Bath Iron Works, Inc.)
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Bradford Breakers
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Bradmills
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Dixie Non Clog Hammermills
Single Rolls
Reversible Impactors
Kue-Ken Jaws
Kue-Ken Gyratories

actually carbonized underground and the resulting gases are removed and used as fuels and as raw material for chemical processes. Dr. Sarapuu, who serves as research consultant for several Midwest firms, has conducted extensive experimentation in the fields of oil reclamation and coal electrocarbonization. Early experimentation was made by Dr. Sarapuu at Sinclair Coal's Tiger mine near Pleasanton, Kan. As a result of the success of these experiments, Dr. Sarapuu was requested by the United States government to apply his process at the Gorgas, Ala., USBM Underground Gasification Experimentation Station.

And For Your Information . . .

Coal reserves for its Maitland mine and about one-third of those of its Carswell mine, in McDowell County, West Virginia, have been leased by Eastern Gas & Fuel Associates, Coal Div., to the Peerless Coal & Coke Co. The property adjoins the Peerless No. 4 mine at Vivian and has been added to its reserves to provide many more years of operating life, according to Peerless officials. In announcing the lease, EG&FA indicated that it had given up plans for reopening the two mines, which had been down for some months. The remainder of the Carswell reserves has been added to those of EG&FA's Keystone mine, whose operation is not affected.

Col. Henry Crown, industrialist and chairman of the board of the Freeman Coal Corp., Chicago, last month became the sole owner of the 102-story Empire State Pldg., in New York City. Col. Crown first obtained a 24% interest in 1951 and prior to purchase of the remaining stock Oct. 14 had increased his holdings to 64%. Some $49,500,000 was involved in acquisition of the property, it was reported.

A new 66,000-kw electric generating station, the largest power unit operated by the Hartford Electric Light Co., recently went into service at Middletown, Conn., as the initial unit at a site capable of ultimate expansion to more than 500,000 kw. Designed for two fuels, pulverized coal and fuel oil, the plant is the latest major unit in the company's expansion program and will serve to boost the interconnected systems of Hartford Electric and the Connecticut Power Co.

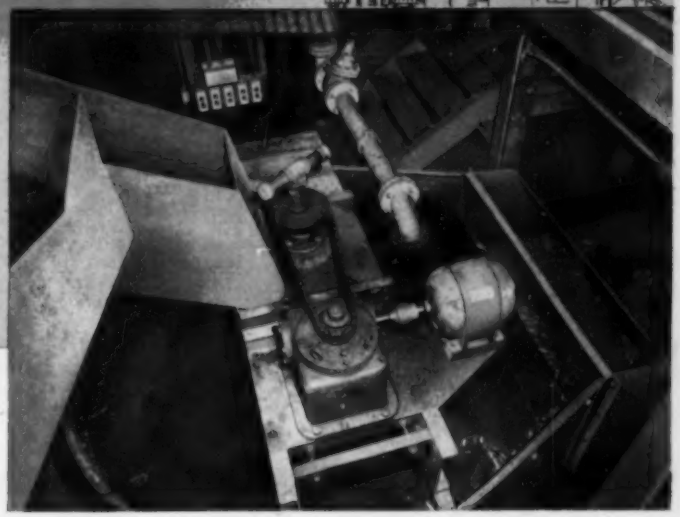
The longest underground conveyor system in the United States will be installed in a potash mine in Carlsbad, N. M., taking the "title" from the 5½-mi system currently operating in a western Pennsylvania coal mine. A contract for the design, machinery and belting necessary to extend the present 5,800-ft underground conveyor system to 38,120 ft, or approximately 7¼ mi, has been awarded to Hewitt-Robins, Inc., by the Potash Co. of America. When completed late in 1955, the system will consist of 45 units receiving the potash ore from continuous miners via shuttle-type conveyors and intermediate belts.

The Clinchfield Coal Co. announced Oct. 18 the sale of gas from its wells in

Jeddo-Highland's Consulting Engineers Chose

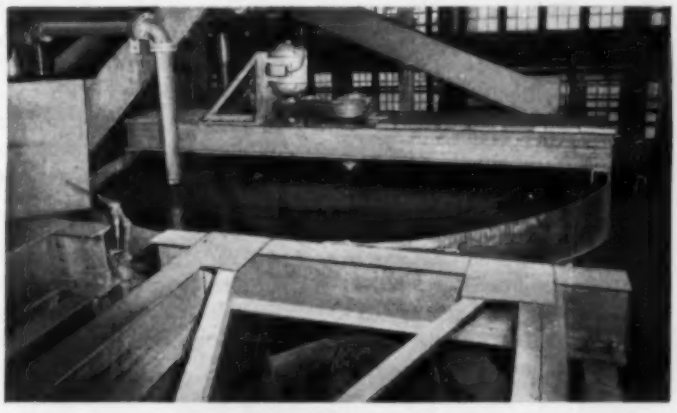
WILMOT CONE and Classifier CLEANERS

. . . after exhaustive comparisons for yield and automation



Above, Wilmot Cone Cleaner in Jeddo-Highland Coal Company's recently modernized anthracite fines plant. Feed chute at left. In background, panel for Wilmot patented automatic controls. With their near approach to push-button operation, Wilmot units have affected remarkable increases in the ratio between yield and labor costs, which have made it practical and profitable to recover the fine sizes.

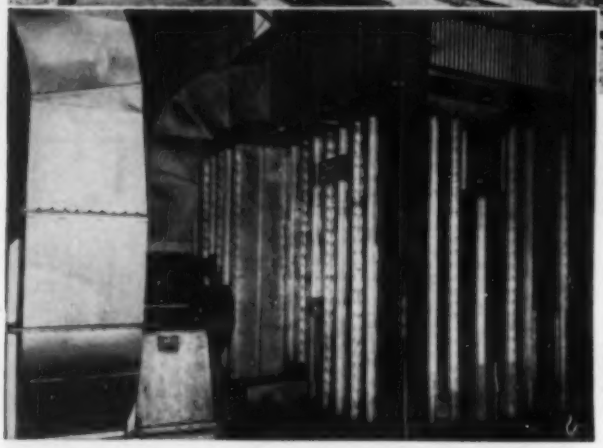
"No other equipment would do the job as efficiently" was the conclusion about Wilmot Cleaners, after extended comparative studies were conducted by the consulting engineers on the fine coal plant at Jeddo-Highland's No. 5 operation. This Pennsylvania anthracite plant, recently started, is fed from basins containing 6,500,000 tons of silt, with a probable life of ten years. The Wilmot Fine Coal Recovery System is used for both bituminous and anthracite. At the No. 5 plant it consists of a Wilmot Cone Cleaner for No. 4 coal (−3/32" x + 3/64") and a Wilmot Classifier Cleaner for No. 5 (−3/64" x + 48 mesh). To meet varying conditions, the Wilmot Froth Unit is used for cleaning a greater range of fine sizes from −1/8" to 0. All three Wilmot units are completely automatic.



Wilmot 16 ft. Classifier cleaning No. 5 coal at the Jeddo-Highland plant.

WILMOT ENGINEERING CO.

HAZLETON, PA.
Plant:
WHITE HAVEN, PA.



At the Ilmann Plant of Pocahontas Fuel Co., Pocahontas, Va., dust is captured at the air plant (left) in Pangborn Dust Collectors.

Close-up of Pangborn Dust Collector operating within plant.

For more profitable coal preparation

Look to

PANGBORN DUST CONTROL

More mechanization and more production have helped the coal industry meet industry's vastly increased demands over the past decade. But they have created a serious problem for coal processing plants. If *you* face this problem—it will pay you to look to Pangborn Dust Control for the answer!

Pangborn Dust Control traps dust at the source—at tipples, dry cleaning, de-dusting and other operations. And Pangborn Dust Control saves you money, pays for itself by . . . (1) improving the reclamation of valuable dust . . . (2) lowering plant maintenance costs . . . (3) increasing the life of your machines because they operate in a cleaner atmosphere. What's more, higher morale and better health of employees mean increased production.

If you're losing profits because of excessive dust, let Pangborn engineers conduct a free Dust Pocket Survey. It costs you nothing but can mean big savings. Write today for details and your free copy of Bulletin 909A. Just address: PANGBORN CORPORATION, 2800 Pangborn Blvd., Hagerstown, Maryland.

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment

Pangborn DUST CONTROL

STOPS THE DUST HOG from stealing profits

Dickenson County, Virginia, to the Kentucky-West Virginia Gas Co., a subsidiary of the Equitable Gas System. Distribution is scheduled to start as soon as pipe lines are constructed. Clinchfield owns gas rights to more than 400,000 acres in southwest Virginia and 48 of the 57 wells drilled in the area have been productive, it is reported. Drilling now is in progress at five more wells.

Discontinuation of operations of its Watson mine, White Station, Indiana County, Pa., effective Sept. 30, has been announced by the Westmoreland Mining Co. The mine, which produces coal primarily of a metallurgical quality, employed as many as 250 men until the fall of 1952. During last September it had approximately 85 employees, producing over 800 tpd of clean coal. The shutdown was ascribed by company officials primarily to market conditions which had curtailed volume so as to make profitable operation no longer possible. The mine will be maintained in a condition that will permit re-opening if the market for the coal improves substantially.

The 1953 Annual Report of the Pittsburgh Consolidation Coal Co. has been judged the best of the coal and coke industry in the annual competition sponsored by the *Financial World* magazine. Company officials were scheduled to receive a bronze "Oscar of Industry" Oct. 25, the third such award received by Pitt-Consol.

Campaigning for election as Senator, former Vice President Alben W. Barkley, speaking in Harlan, Ky., Oct. 15, again urged the administration to establish a far-reaching program of stabilization for coal and other fuels. Citing the drop in coal production, he said: "It is the duty of the government to work out an overall, far-sighted program that will bring justice and equality to all these great fuels—coal, petroleum and natural gas."

Re-opening of its Dorrance colliery, Wilkes-Barre, Pa., was scheduled by the Lehigh Valley Coal Co. for Oct. 4, following an agreement on working conditions with the UMWA local. The property, which had been closed since May 5, will employ some 250 men, about half its normal working force.

The strip-mine reclamation program of the Harmon Creek Coal Corp., at Burgettstown, Pa., was featured in a 2-page article and on the color cover of the Sunday Roto Magazine of the *Pittsburgh Press* Oct. 10. Entitled "Face-Lifting at Burgettstown," the heavily illustrated article showed the leveling and planting of the area, creation of a 12-acre lake, and its use for various recreational purposes.

The Pennsylvania Coal Co. has been awarded $17,932 for coal it was required to leave unmined to provide support for a highway right-of-way in Dupont Borough and Pittston Township. Under the terms of the award granted by a court-appointed 5-member state mining commission, the money will be paid by the state and the cost of the proceedings will be paid by Luzerne County.

For draining off corrosive mine waters

REPUBLIC PLASTIC PIPE

Republic Plastic Pipe is made by Pipe Men

CHEMICAL RESISTANCE OF FLEXIBLE PLASTIC PIPE

	At Room Temp.	At 140° F		At Room Temp.	At 140° F
Acetic Acid—10%	A	A	Methyl Bromide	A	A
Acetic Acid—100%	B	X	Milk	A	
Acetone	B	X	Mineral Oil	B	X
Ammonia—880 S.G.	A	A	Nitric Acid—10%	A	A
Ammonium Carbonate	A	A	Nitric Acid—95%	B	X
Beer	A		Phosphoric Acid—20%	A	A
Benzene	X	X	Phosphoric Acid—80%	A	X
Bromine (Vapors or Liquid)	X	X	Photographic Developer	A	A
Calcium Hydroxide	A	A	Potassium Carbonate	A	A
Carbonic Acid	A	A	Potassium Chloride (Saturated)	A	A
Carbon Tetrachloride	X	X	Potassium Dichromate—40%	A	A
Caustic Potash—50%	A	A	Silver Nitrate—10%	A	A
Caustic Soda up to 30%	A	A	Sodium Carbonate (Saturated)	A	A
Caustic Soda 30% and over	A	A	Sodium Chloride (Saturated)	A	A
Chlorine—100%	X	X	Sodium Sulphate	A	A
Citric Acid (Cold Saturated)	A	A	Sulphuric Acid—10%	A	A
Copper Sulphate	A	A	Sulphuric Acid—30%	A	B
Diethylene Glycol	A	B	Sulphurous Acid	A	A
Ethylene Dichloride	X	X	Tannic Acid	A	A
Gasoline	X	X	Tanning Extracts	A	A
Glycerol—50%	A	A	Trichloroethylene	X	X
Formaldehyde	A		Vegetable and Animal Oils	X	X
Formic Acid—100%	A	A	Vinegar	A	A
Hydrobromic Acid—20%	A	A	Whiskey	X	
Hydrochloric Acid—Over 35%	A	A	Wine	X	
Hydrofluoric Acid—75%	A	A	Zinc Chloride	A	A
Hydrogen Peroxide—90%	A	X	Zinc Sulphate	A	A

A—Satisfactory B—Slightly Attacked X—Unsatisfactory

Mine waters can play havoc with pipe. They eat into it, make frequent replacement necessary.

Republic's New Flexible Plastic Pipe, made of polyethylene, resists this type of corrosion. It not only handles the corrosive liquids and gases which are a part of mine operations, but resists electrolytic corrosion as well.

Because it is lightweight and flexible, this new Plastic Pipe can be easily laid and moved from one point to another. It is made up with easily applied plastic insert-type fittings and stainless steel clamps. Fittings are available in a wide range of sizes and types that permit any type of piping arrangement, whether plastic-to-plastic or plastic-to-steel. Assembly is quick and easy.

Republic has proof of the advantages of Flexible Plastic Pipe right in its own mines. For complete data on sizes, fittings and applications of Republic Flexible Plastic Pipe, write to:

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

REPUBLIC STEEL

REPUBLIC PLASTIC PIPE
SEMI-RIGID AND FLEXIBLE

Other Republic Products include Casing—Tubing—Line Pipe—Bolts, Studs, Nuts and Rivets—Heat Exchanger Tubes—Steel Buildings

Among the Manufacturers

Sanford-Day Elects Officers

Sanford-Day Iron Works, Inc., Knoxville, Tenn., has elected C. O. Crump president and a member of the board of directors, succeeding P. S. McCallen, who retired in April. Other officers elected were R. E. Jones, vice president in charge of engineering, and W. D. Moreman, vice president in charge of sales. Sanford-Day's new president was head of the Brown-Fayro Co., which merged with Sanford-Day in April. Prior to his appointment as president of Brown-Fayro in 1948, Mr. Crump was manager of the Enterprise Wheel & Car Corp., and served with that company for 25 yr. Mr. Jones has been with Sanford-Day for over 25 yr, the last seven as chief engineer. Mr. Moreman has served in a sales capacity with the company since 1939, and was elevated from the district office at Bluefield, W. Va., to the main office in Knoxville, in 1952.

Heads Plastic Pipe Sales

National Tube Div., U. S. Steel Corp., has appointed Robert K. Henderson manager of sales—plastic pipe. Mr. Henderson started with U. S. Steel while in college and on his graduation from the University of Pittsburgh in 1936, transferred to National Tube as a New York district salesman. Since 1952, he has been in the Pittsburgh District as manager of market development for National Tube. Succeeding Mr. Henderson is Samuel W. Verner, who formerly was sales promotion assistant, market development.

Nolan Acquires Phillips Line

The Nolan Co., Bowerston, Ohio, has concluded an arrangement under which it will take over production of the Phillips cross-over and kick-back dumps and Phillips mine-car control equipment, mine-run weigh hoppers and radial chutes, formerly manufactured by Phillips Mine & Mill Supply Co., Pittsburgh, Pa. Under the transfer of production, Nolan acquires all inventory, patterns, drawings, patents, etc., dealing with this Phillips line and will continue to use the Phillips name in connection with its manufacture and marketing.

Brake Shoe Sales Official

American Brake Shoe Co., New York, has appointed N. George Belury sales vice president. Mr. Belury, who also continues as president of the company's Engineered Castings Div., joined Brake Shoe in 1937 as a sales apprentice in the Brake Shoe & Casting Div. He became sales manager of Engineered Castings Div. in 1947 and president of the division in 1948. American Brake Shoe Co. has elected Edward R. Anderson a

DUMPING 5 CARS IN 5 SECONDS

At the Trail, British Columbia, Lead and Zinc Mine, owned and operated by The Consolidated Mining and Smelting Co. of Canada, Ltd.

DIFFERENTIAL PRODUCTS INCLUDE

Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Air Dump Cars, Dumping Devices and Complete Haulage Systems.

WITH THE DIFFERENTIAL ROTARY DUMPER

It's everyday procedure at this Canadian lead and zinc mine. A touch of the air control starts the dumping action and the law of gravity takes over. It's as simple as that!

Simplicity in design, speedy operation, low upkeep, safety, low initial cost and ease of erection . . . these are some of the reasons why you are seeing more and more single and multiple Differential Dumpers in the mining world.

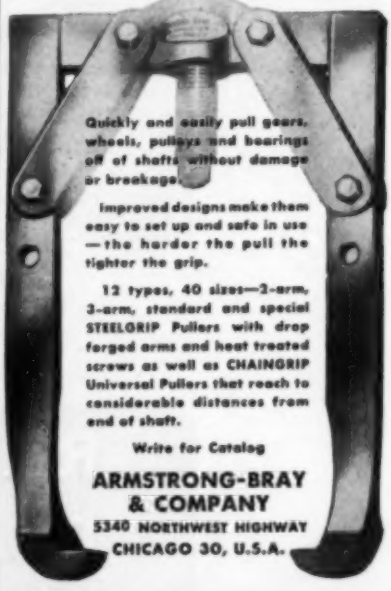
Our engineering service is at your service!

DIFFERENTIAL STEEL CAR COMPANY

FINDLAY, OHIO

SINCE 1915 — PIONEERS IN HAULAGE EQUIPMENT

ARMSTRONG-BRAY GEAR and WHEEL PULLERS



Quickly and easily pull gears, wheels, pulleys and bearings off of shafts without damage or breakage.

Improved designs make them easy to set up and safe in use — the harder the pull the tighter the grip.

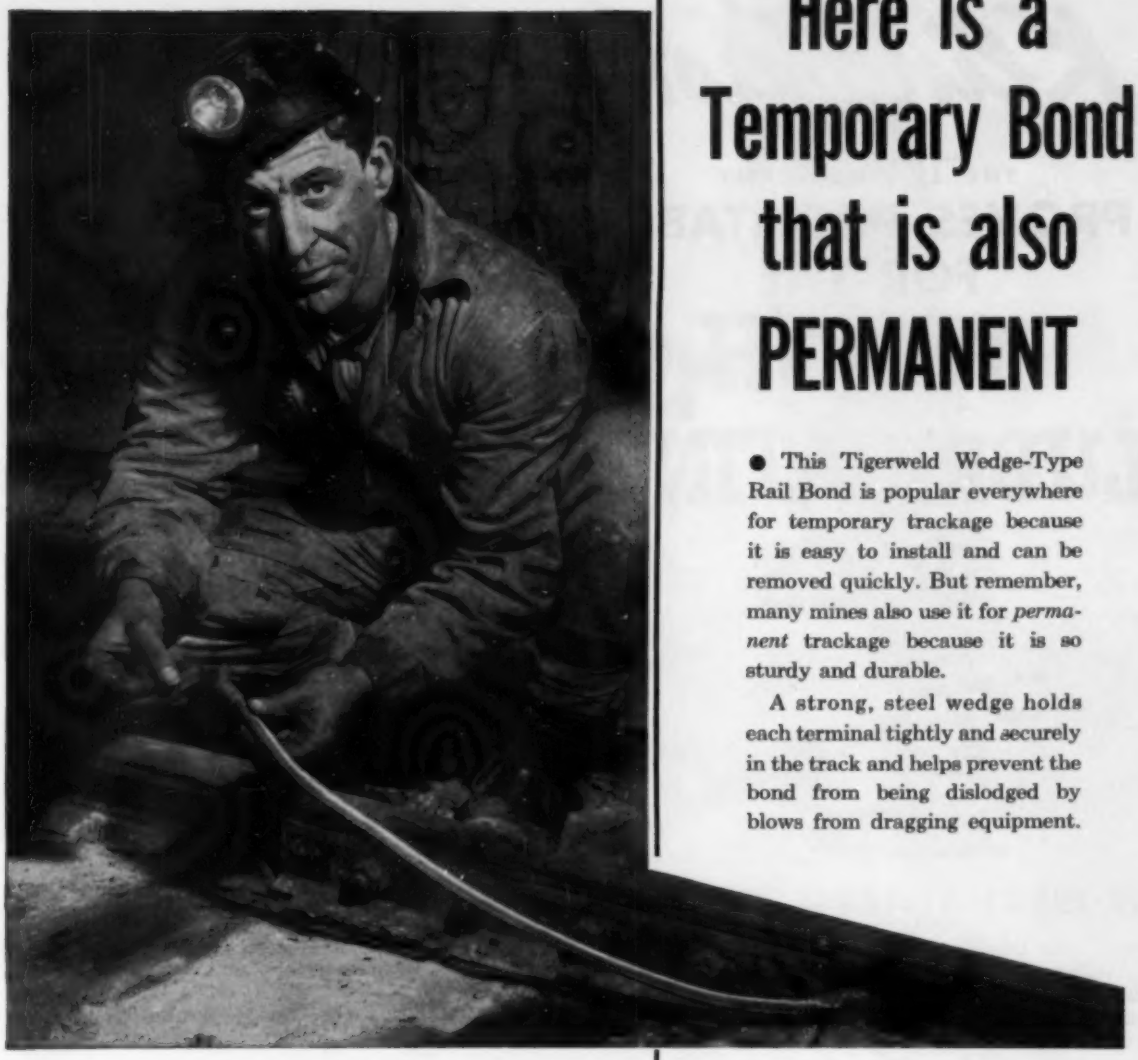
12 types, 40 sizes—2-arm, 3-arm, standard and special STEELGRIP Pullers with drop forged arms and heat treated screws as well as CHAINGRIP Universal Pullers that reach to considerable distances from end of shaft.

Write for Catalog

ARMSTRONG-BRAY & COMPANY

5340 NORTHWEST HIGHWAY

CHICAGO 30, U.S.A.



Here is a Temporary Bond that is also PERMANENT

● This Tigerweld Wedge-Type Rail Bond is popular everywhere for temporary trackage because it is easy to install and can be removed quickly. But remember, many mines also use it for *permanent* trackage because it is so sturdy and durable.

A strong, steel wedge holds each terminal tightly and securely in the track and helps prevent the bond from being dislodged by blows from dragging equipment.

Installation is a SNAP!

Simply drill a hole in the track. Insert the terminal, then the wedge. Pound in the wedge. Three sharp blows with a 2½ lb. hammer and you're done! You've got a durable, low-resistance bond that is easy to remove if the track must be relocated . . . one that is sure to give dependable, lasting service if the track is permanent.

Write for complete information

AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

USS Tigerweld Rail Bonds

UNITED STATES STEEL

LEADOLENE
Klingfast

THE "IP"* LUBRICANT
PROVES PROFITABLE FOR THE TOUGH LUBRICATING JOBS

IN MECHANIZED MINING

Specifically compounded for your particular needs, LEADOLENE KLINGFAST is a tough, lead-based lubricant with a great variety of applications in the coal industry. This lubricant . . . with its "indestructible pH-ilm" making possible efficient lubrication even in the presence of coal dust and other abrasive factors . . . regularly reduces costs and extends equipment life on the toughest of applications.

We suggest you read the accompanying case histories to see what LEADOLENE KLINGFAST has done for others . . . then describe your toughest lubrication problem and Brooks will prepare a sample designed to give best service on that particular application.

*I. P. . . . "Indestructible pH-ilm," capable of withstanding pressures up to 50,000 psi.

The Brooks Oil Co.

Since 1876

Executive Offices and Plant . . . . . CLEVELAND, OHIO
Executive Sales Office . . . . . PITTSBURGH, PA.
Canadian Office and Plant . . . . . HAMILTON, ONTARIO
Cuban Office . . . . . SANTIAGO de CUBA

Case Studies

WIRE ROPE

A certain strip mining shovel, on which a conventional lubricant was used, had a wire rope failure on an average of every 18 days of service. A single application of KLINGFAST extended the service to a record of 31 days.

CORROSION PROTECTION

Due to sulphurous and other extremely corrosive agents used in quenching, the steel work in and around the quencher station of by-products coke plants is subjected to most severe corrosion. In one specific application maintenance costs were particularly high since no paint would protect for as much as a year. A grade of KLINGFAST, which was brushed on as a protector coating, gave in excess of two years of protection.

OPEN GEARS

A motor-operated hoist-equipped with double herringbone cut teeth pinions and gears is used to operate 5-ton clam shell buckets at a large coke plant. Although a high grade plastic compound was applied every 24 hours, it failed to prevent wear of the gearing. On this application, which includes intermittent operation, reversing, high speed, severe shock and contamination from coal dust, KLINGFAST is applied only once every 10 days, and costs 25% less per pound than the lubricant it replaced.

DIPPER STICKS

Due to excessive moisture and other conditions, a company had to lubricate their shovel dipper stick once each day. Since KLINGFAST has been adopted as their standard, lubrication application now is necessary only once every three weeks.

MINE EQUIPMENT

Mining machines are quite a problem in lubrication because of water, dust, shock, vibration, speed and excessive loading. LEADOLENE fluids have proven a great advantage in the gear cases of loaders in one large mine because of repellence of water, adhesiveness to prevent excessive leakage, high film strength to prevent wear of gears and worms and other characteristics for this tough job. Lubricants take a terrific beating and LEADOLENE is one that stands up and takes it.

Write Today for Free Sample!

Dorr Honored on 50th Yr.

DR. JOHN V. N. DORR (center), founder and chairman of The Dorr Co., views a scale model of the first Dorr classifier presented by 100 members of his veteran staff in celebration of the 50th Anniversary of its inception. Invented in 1904, the unit was the first of the three basic inventions upon which the company was founded.

The presentation was made before nearly 1,000 staff members and their families and guests at the company's annual picnic late in August at its Westport (Conn.) Research and Testing Laboratories. J. D. Hitch, Jr. (left), president, and E. R. Ramsey (right), vice chairman of the board, made the presentation on behalf of the 100 staff members with the longest tenure of service.

vice president. Mr. Anderson, who joined the company in 1930, also continues as president of the AmForge Div. of the company, a post he has held since 1952.

Olin Explosives Appoints

Olin Mathieson Chemical Corp., East Alton, Ill., has named L. F. Baity assistant sales manager of the Explosives Div., and has appointed R. V. Wakefield sales manager of the Armstrong Coalbreak products. W. G. H. Latham has been made sales manager of the Liberty Powder Co., an Olin-Mathieson subsidiary. Messrs. Baity and Wakefield will be located at headquarters of the Explosives Div. in East Alton. Mr. Latham, who has been a special representative of Liberty Powder Co., will continue to represent the Pittsburgh area. J. J. O'Neill Jr. has been named to the newly created position of assistant to the general manager of the Explosives Div.

Exide Shifts Branch Officials

Exide Industrial Div., Electric Storage Battery Co., has transferred Charles H. Leet, Pittsburgh branch manager, to its larger Chicago office as assistant branch

(*Continued on p 168*)

Collyer
PORTABLE
POWER CABLES
P-107 BM COLLYER
Made
for the Mine
Collyer welcomes the opportunity of working with you on your mining cable requirements. There's a Collyer cable for every purpose. Write for Bulletin 152 . . . or tell us about your own particular power problems.
Collyer Insulated Wire Co., 245 Roosevelt Avenue, Pawtucket, R. I.

"Here's where we can't go wrong," I told John

John is my partner in a small manufacturing enterprise we started six years ago. Recently we decided to build a new plant that would give us added space and the most modern facilities. There were a lot of hard decisions to make because we just haven't enough money to afford mistakes, even little ones.

Then came the question of what fuel to use. The answer to this one was so easy, it was almost a relief. Coal—for these reasons:

The cost of quality coal to meet our most exacting requirements should be substantially less than that of any other fuel.

With modern stoker and coal and ash handling equipment, our steam costs should be reduced to a minimum.

Not only can we store as much reserve coal as we require in our own yard safely and inexpensively, but there's no worry about curtailment in delivery and diminishing supply, as could be the case with other fuels.

We figured, too, that if companies many times our size are burning coal – and for the same reasons – we can't go wrong.

COAL
FUEL OF THE FUTURE

Chesapeake and Ohio Railway

World's Largest Carrier of Bituminous Coal

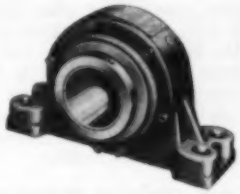
Bring your fuel problems to C &O

As the world's largest carrier of bituminous coal, the C&O is intimately familiar with every phase of coal use. We have a large staff of experts who will gladly help you to locate the coal best suited to your needs; to help you use it most efficiently; to help get it to you promptly.

Write to:
Coal Traffic Department
Chesapeake and Ohio Railway
2119 Terminal Tower
Cleveland 1, Ohio

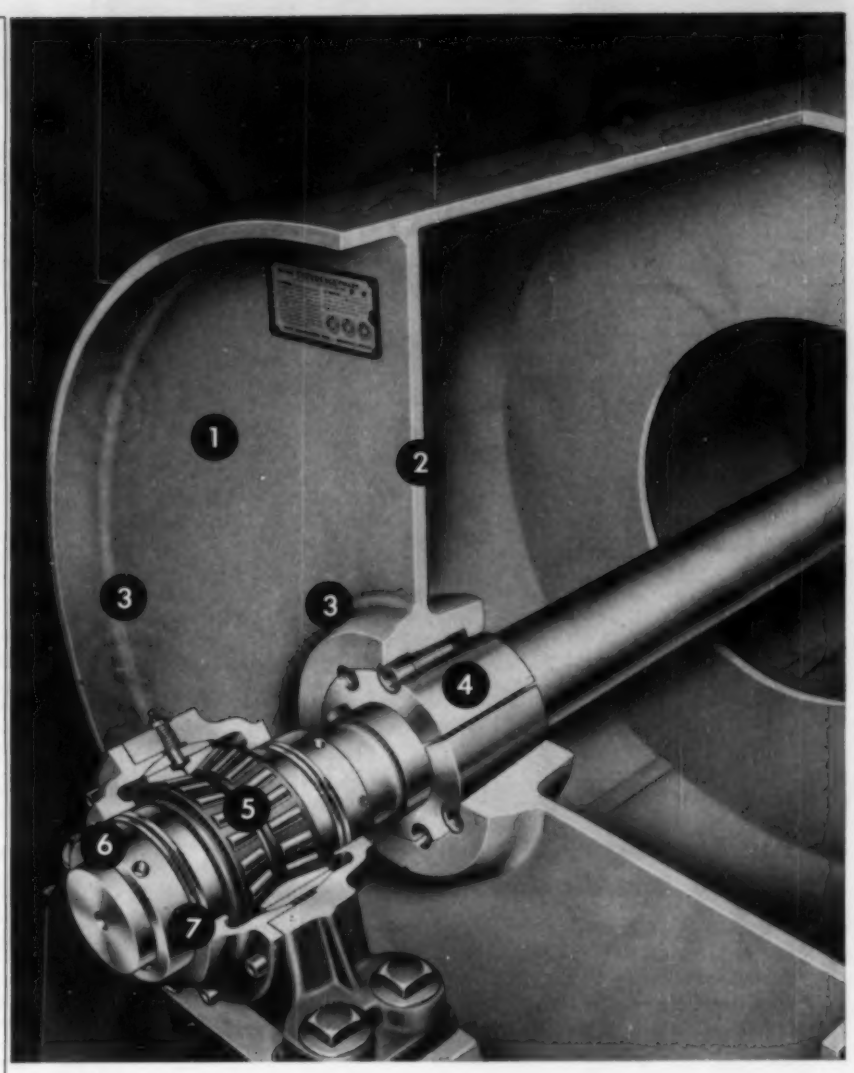
TAPER-LOCK SOLID STEEL CONVEYOR PULLEY

1. ***DRUM DESIGN***
   — maximum strength
   — minimum weight
2. ***FULLY ENCLOSED***
   no dust — no dirt — no water
3. ***SUBMERGED-ARC PROCESS***
   — full strength in all welds
4. ***TAPER-LOCK BUSHING***
   — no walking on shaft
   — easy on — easy off!



DODGE-TIMKEN ALL-STEEL PILLOW BLOCK

5. ***NEW HEAVY-DUTY TIMKEN ROLLER BEARINGS***
   — fully self-aligning
6. ***HEAVY-DUTY ADAPTER MOUNTING***
7. ***Sealed both on and off the shaft with DOUBLE PISTON RINGS***



Here's a heavy-duty combination for tough conveyor jobs!

Pulleys from 6 in. to 8 ft. in diameter, all face widths. Bearings from 2 15/16" to 10" bores. Popular sizes stocked by our Distributors. Write for detailed information.

DODGE

of Mishawaka, Ind.

Call the Transmissioneer, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

DODGE MANUFACTURING CORPORATION, 3000 UNION STREET, MISHAWAKA, INDIANA

Insure Safety with

SIMPLEX ROOF JACKS and PULLERS in Roof Bolt Installation

For Temporary Support During Installation . . .

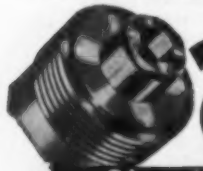
Simplex Mine Roof Jacks—Safe, inexpensive, temporary roof support is provided by Simplex Roof Jacks during installation of suspension supports. They eliminate need for costly, time-consuming temporary timbering. Available in 8 and 16 ton capacities with several types of heads and a wide range of heights.

For Testing Load Factor After Roof Bolt Installation . . .

Simplex Re-Mo-Trol Hydraulic Center-Hole Pullers—Check the strength of roof bolt installations with the new Simplex Re-Mo-Trol Hydraulic Pumps and Rams. Re-Mo-Trol with a Center-Hole Ram is the easiest, safest method for testing the load-bearing ability of suspension supports. Tests are made merely by slipping the Re-Mo-Trol Ram over the bolt, which passes through the Center-Hole, and fastening the nut. Smooth, torque-free force is applied by operating the pump unit, and the stress can be read directly in tons from a gauge on the pump. The test is completed in minutes! Re-Mo-Trols are available in 7 models—10 to 100 ton capacities.

Where a self-contained testing unit is desired, the Simplex Center-Hole Jenny is ideal. Six models in capacities from 30 to 100 tons.

For full information, write for Bulletins: HYDRAULIC 53 and MINES 47



THE CENTER-HOLE MAKES IT EASY . . . only Simplex has the Center-Hole

Simplex LEVER • SCREW • HYDRAULIC Jacks

SIMPLEX JACKS—*Standard for Safety —for ALL Mining Jobs*

TEMPLETON, KENLY & CO.

2501 Gardner Road, Broadview, Illinois

manager, R. L. Kegg, with Exide since 1951 as branch sales engineer at Pittsburgh, succeeds Mr. Leet as branch sales manager. Mr. Leet joined Exide in 1938 as a sales engineer in Pittsburgh and became branch manager in 1949.

Daniels Co. Opens Division

The Daniels Co., Contractors, Inc., Indiana, Pa., has announced the opening of its Appalachian Div., in Bluefield, W. Va., with sales, service and engineering under the direction of J. Baird Richardson. The new division, will have charge of the company's operations in West Virginia, Virginia and Kentucky.

G-E Opens Welding Plant

The official opening of General Electric Co.'s welding plant in York, Pa., was held Oct. 21. The result of long-term planning, the plant is headquarters of G-E welding products and contains modern manufacturing facilities for a wide range of welders and equipment. Formerly located at Fitchburg, Mass., the welding department moved its entire manufacturing and administrative facilities to York last January.

Heads Sales for Oliver United

Oliver United Filters Inc., Oakland, Calif., has named Ward H. Pitkin general sales manager. A graduate of the University of Michigan, Mr. Pitkin first became associated with Oliver United in 1925, and since then has been connected in various capacities in research, as head of the pulp and paper division, and most recently as assistant general sales manager. He succeeds R. Gordon Walker, vice president and general sales manager, who has retired under the company's retirement plan. Associated with the organization since its inception, Mr. Walker established the sales headquarters of the company in New York as vice president and general sales manager, in 1917, and later became a member of the board of directors, a position which he still retains.

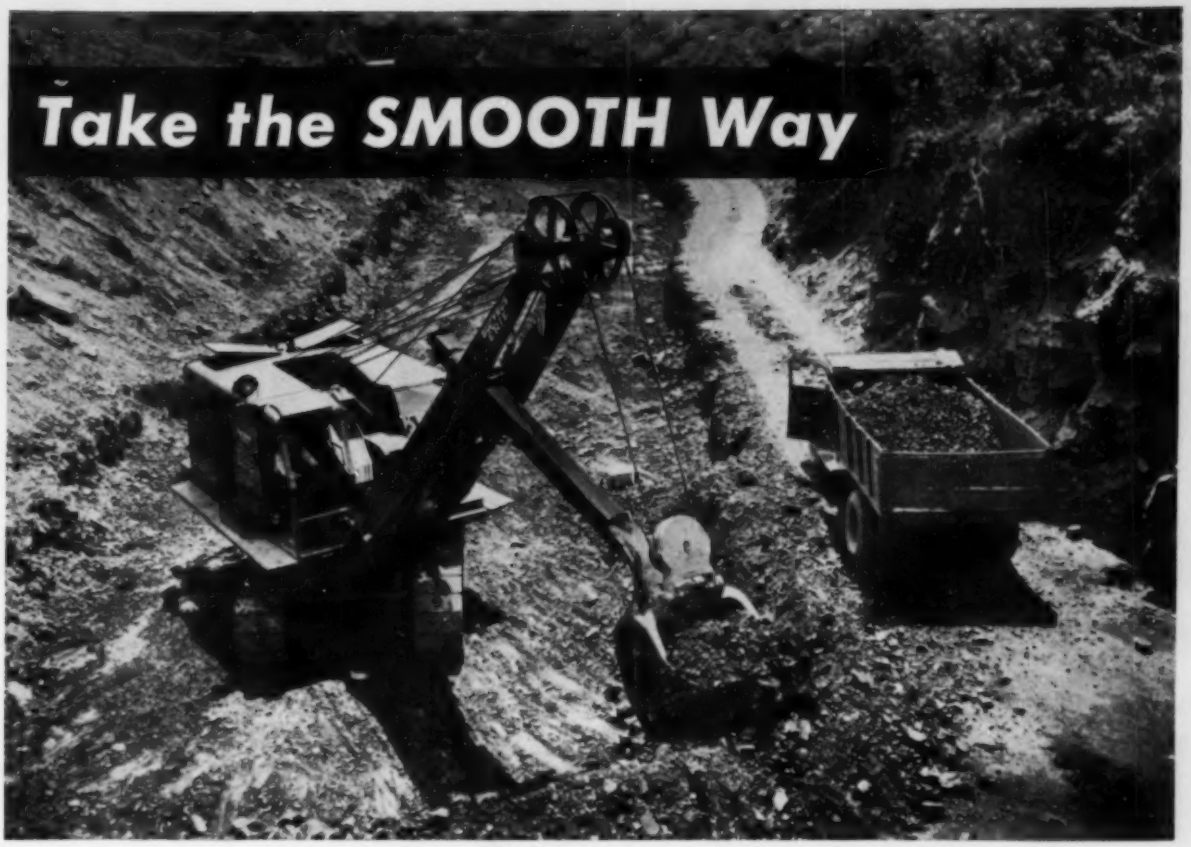
Blaw-Knox Division Manager

Blaw-Knox Co., Pittsburgh, Pa., has appointed E. C. Rook vice president and general manager of the Equipment Div., succeeding G. L. Dirks, who resigned. Mr. Rook recently retired as a captain in the U. S. Navy after 34 yr in the service and in his most recent assignment, managed the large Naval Ammunition Depot at Crane, Ind.

Quaker-Pioneer Merge in West

The West Coast operations of Quaker Rubber Corp. and its recent acquisition, Pioneer Rubber Mills, Pittsburg, Calif., will merge under the name Quaker Pioneer Rubber Mills, Div. of H. K. Porter Co., Inc. Quaker Pioneer Rubber Mills will handle all the sales, manufacturing and service operations of both companies in 10 western states. The Pioneer and Quaker sales organizations will be combined in the east and operated under the Quaker Rubber Corp. The new company has announced the purchase of the lawn-hose division of Extruders, Inc.,

(*Continued on p 172*)



To Bigger Output

Measure an excavator's output potential not only by size, weight, and horsepower but also by its ability to dig, swing, and dump in a fast, smooth, continuous motion. That's where Bucyrus-Erie Individual Design makes such a big difference.

Each model in the Bucyrus-Erie line is built from the ground up to handle its rated load most efficiently. Power, weight, speed and strength are all properly balanced for peak operating efficiency. The result is fast, smooth work cycles that materially boost your output, sharply cut your upkeep costs.

With a Bucyrus-Erie excavator in your pit, you'll find you can load higher tonnages of coal shift after shift. See your local Bucyrus-Erie distributor now for the full story!

49E54

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY South Milwaukee, Wisconsin

• 3/8-to 4-yd. gasoline, diesel, or single motor electric convertible excavators •

NEW CHEVROLET TRUCKS

have what it takes to boost efficiency and bring down costs!

In the next three paragraphs you'll find a few good reasons why you can get more work out of a Chevrolet truck and save money doing it.

INCREASED POWER IS THE FIRST BIG REASON

With Chevrolet's higher compression ratio you've got more power under the hood. Power that results in greater acceleration and hill-climbing ability. Faster starts and acceleration over the day's work save valuable time and increase over-all efficiency. Check the gas mileage, too. With this higher compression ratio, your Chevrolet truck registers *more miles on the job* for each tankful of gas. That's where you start to save money.

BUILT-IN RUGGEDNESS SAVES EVEN MORE

The strength and stamina of more rigid frames, and the special chassis features that pertain to each model—these combine to add extra ruggedness to your Chevrolet truck. Push it hard on the rough jobs; keep it going over long schedules—you'll still find your upkeep costs lower and your Chevrolet trucks lasting a lot longer.

ONE LAST POINT—and maybe the most important to you—you'll find Chevrolet's line of trucks priced the lowest of all! Talk over your needs with your Chevrolet dealer. He'll be glad to give you the facts about the best model for your job. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

MOST TRUSTWORTHY TRUCKS ON ANY JOB! CHEVROLET

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

THREE GREAT ENGINES—The new "Jobmaster 261" engine* for extra heavy hauling. The "Thriftmaster 235" or "Loadmaster 235" for light-, medium- and heavy-duty hauling. **NEW TRUCK HYDRA-MATIC TRANSMISSION***—offered on ½-, ¾- and 1-ton models. Heavy-Duty **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **DIAPHRAGM SPRING CLUTCH**—improved-action engagement. **HYPOID REAR AXLE**—for longer life on all models. **TORQUE-ACTION BRAKES**—on all wheels on light- and medium-duty models. **TWIN-ACTION REAR WHEEL BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—greater holding ability on heavy-duty models. **NEW RIDE CONTROL SEAT***—eliminates back-rubbing. **NEW, LARGER UNIT-DESIGNED PICKUP AND PLATFORM STAKE BODIES**—give increased load space. **COMFORTMASTER CAB**—offers greater comfort, convenience and safety. **PANORAMIC WINDSHIELD**—for increased driver vision. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—easier, safer handling. **ADVANCE-DESIGN STYLING**—rugged, handsome appearance.

**Optional at extra cost. Ride Control Seat is available on all cabs of 1½- and 2-ton models, standard cabs only in other models. "Jobmaster 261" engine available on 2-ton models, truck Hydra-Matic transmission on ½-, ¾- and 1-ton models.*

IMPOSSIBLE WITHOUT EXPLOSIVES

Stripping operations accounted for nearly one quarter of the total production of coal last year. This photo illustrates a deposit five feet thick which could be reached only by blasting and removing 75 feet of over-burden. This is the kind of job that never could be handled economically without explosives. Hercules has pioneered in developing the right types of explosives and has the service facilities to help you to solve blasting problems concerning coal mining, metal mining, quarrying, construction, or petroleum.

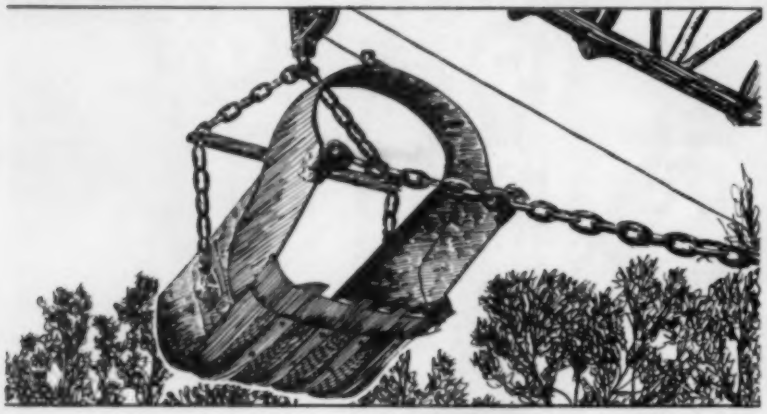
HERCULES POWDER COMPANY
INCORPORATED

Explosives Department, 936 King St., Wilmington 99, Del.

Birmingham, Ala.; Chicago, Ill.; Duluth, Minn.; Hazleton, Pa.; Joplin, Mo.; Los Angeles, Cal.; New York, N. Y.; Pittsburgh, Pa.; Salt Lake City, Utah; San Francisco, Cal.

xx

RM FOR MEDIUM DIGGING

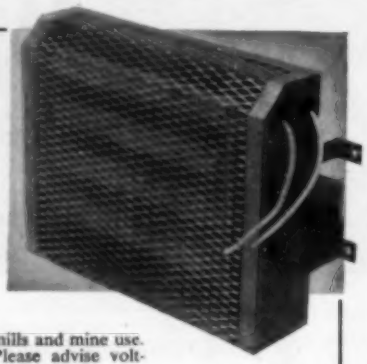


New medium weight Automatic Dragline Bucket digs sand—loose gravel—dirt. Its new knife-edged lip and teeth cast of high manganese steel; resists shock and wear. More details? Write Dept. "E".

PAGE ENGINEERING COMPANY
CLEARING POST OFFICE • CHICAGO 38

Page
AUTOMATIC
DRAGLINE BUCKETS

GUYAN HEATER UNITS FOR INDUSTRIAL APPLICATIONS



•Guyan natural convection heater answers the problem of small, hard to heat places (such as locomotive cabs, crane cabs, pump houses and small offices) requiring a dependable, long life heater.

Consisting of corrosion resistant aluminum chromium alloy wire wound on ceramic forms and mounted within expanded steel housings, these heaters can be furnished from 1500 watts thru 7500 watts for 110, 220, 250, 440, 500 volts DC or AC, single or three phase.

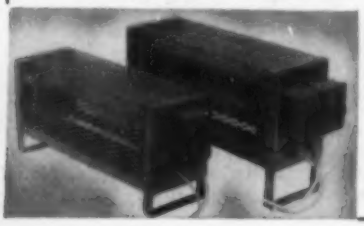
The illustrations show the wall and floor type heaters furnished either with or without switches.

Guyan heaters are designed to withstand the hard service and abuse that is commonly experienced in industrial mills and mine use.

Please advise voltage, wattage required and type heater when ordering or requesting quotation.

For larger areas the Guyan Forced Convection Heater is recommended. These heaters are furnished from 4000 watts thru 15000 watts.

Guyan Forced Convection Heaters are manufactured with a heavy duty silent propeller type fan incorporated into the design of the heater. Prices furnished on request.



GUYAN
MACHINERY COMPANY
LOGAN • WEST VIRGINIA

COAL MEN ON THE JOB . . .
BELL & ZOLLER COAL CO.: Willie Lovan (left) and O. H. Prince, mine foremen, Oriole mine, Madisonville, Ky.

Hawthorne, Calif., and plans to expand its lawn-hose manufacturing facilities and increase customer service.

Republic Steel Ups Sales Head

Republic Steel Corp., Cleveland, has appointed Harvey A. Craig manager of sales, Bolt and Nut Div. Mr. Craig, former Pacific Coast sales manager, succeeds Robert C. Klemm who is making plans for his retirement at a later date, and who will continue with the Bolt and Nut Div. in an advisory capacity as assistant manager of sales. Mr. Klemm has been associated with the company and its predecessor for more than 40 yr.

Hough Names Sales Engineer

The Frank G. Hough Co., Libertyville, Ill., has appointed Jim Suter to the post of sales engineer, in which position he will act as liaison between the sales department, Hough district representatives and other departments. Mr. Suter has a background of engineering, plus 4 yr as a Hough district representative and 2 yr as assistant sales manager for a Hough distributor.

Morse Chain Officials Move

Frank M. Hawley has been elected chairman of the board and Stanley J. Roush president and general manager of Morse Chain Co., Detroit, a subsidiary of Borg-Warner Corp. With the company since 1916, Mr. Hawley previously was president and general manager of Morse Chain. Mr. Roush is also president of the Atkins Saw Div. of Borg-Warner, a position he retains. Borg-Warner Corp. also has announced the appointment of Carl J. Meister as vice president of the Atkins Saw Div. Mr. Meister was formerly vice president and director of sales for the Atlas Chain & Mfg. Co.

In Gar Wood Sales Posts

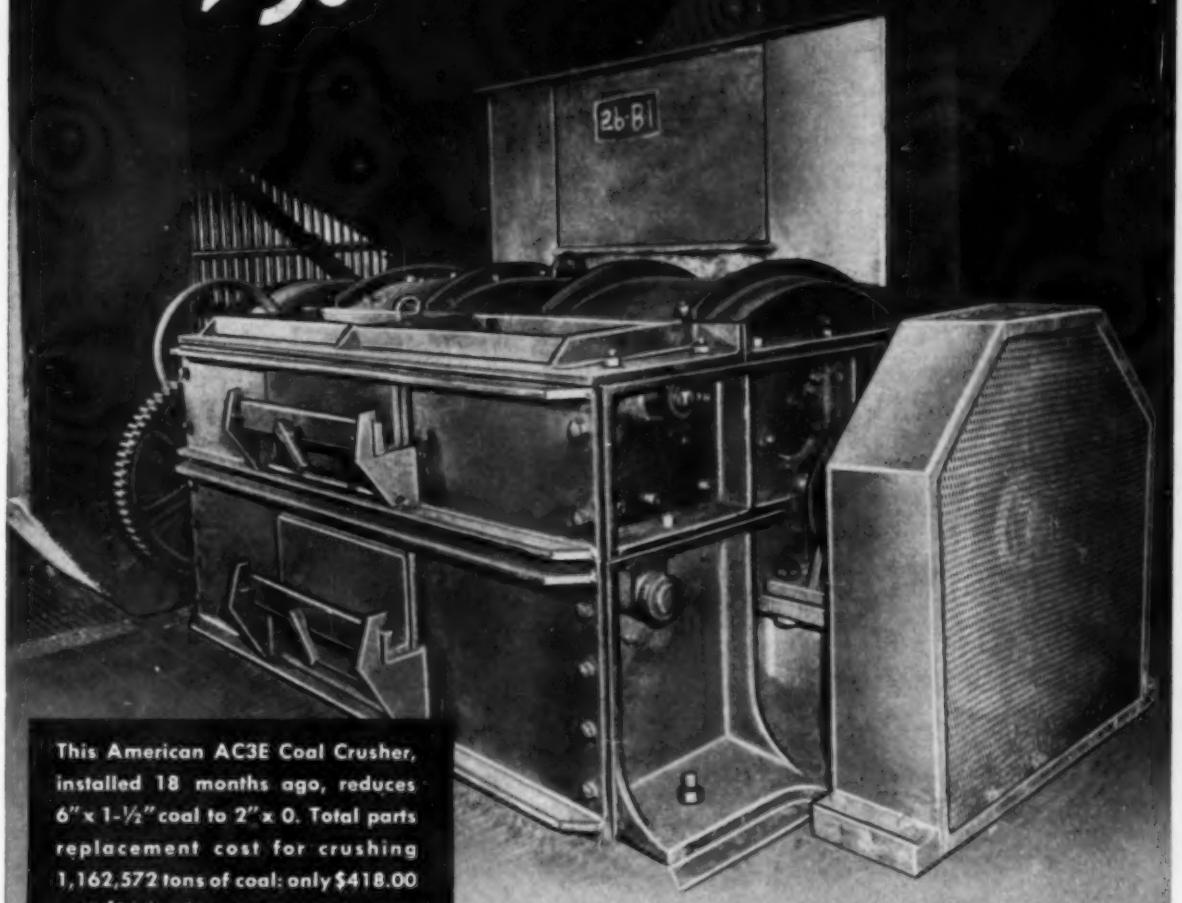
Gar Wood Industries, Wayne, Mich., has appointed B. F. Whitbread product sales manager for Gar Wood hydraulic hoists and dump bodies. With the company almost 20 yr, Mr. Whitbread has

AMERICAN ROLLING RING CRUSHER

Reduces 1,162,572 Tons of Coal

...at parts replacement cost of

1/30th of a cent per ton!



This American AC3E Coal Crusher, installed 18 months ago, reduces 6" x 1-½" coal to 2" x 0. Total parts replacement cost for crushing 1,162,572 tons of coal: only $418.00 or 1/30th of a cent per ton.

"When You Figure Cost Per Ton...
the Best Answers Come From American"

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 MACKLIND AVE. • SAINT LOUIS 10, MO.

WEIGH IT ON THE GO!

Builders Conveyoflo—the modern conveyor meter — totalizes the weight of dry material passing over conveyor belts. Continuous, automatic, extremely accurate — Conveyoflo is installed right in your present conveyor, or can be furnished as a separate, self-powered conveyor and scale unit. Capacity is limited only by the capacity of the conveyor belt itself.

EXCLUSIVE FEATURES

- Accurate . . . within ± ½ of 1% of actual weight from maximum to 50% of meter's rated capacity; within 1% from 50% to 25% rate; within 2% from 25% to 10% of rated capacity.
- Automatic totalizer compensation for variations in belt speed and changes in belt weight.
- Responds accurately to rapid load variations.
- Paces auxiliary equipment (feeders, controllers, continuous blending processes, etc.) and operates secondary instruments.

Write for Bulletin 550-H4. Builders-Providence, Inc. (Division of B-I-F Industries, Inc.), 391 Harris Avenue, Providence 1, Rhode Island.

BUILDERS-PROVIDENCE
DIVISION OF B-I-F INDUSTRIES, INC. METERS FEEDERS CONTROLS

DEISTER

Type UHS Heavy Duty SCALPER

● Deister Type UHS Heavy Duty Scalper is built in 3′, 4′ and 5′ widths, 10, 12, 14 feet long, and in single, double, and triple deck sizes. Over 100 standard Deister models to handle any coal sizing problem.

- Unitized Lifetime Vibrating Mechanism
- Opposed Elliptical Throw
- Divided Screening sections readily interchangeable for longer screen cloth life.

DEISTER MACHINE CO., Fort Wayne 4, Indiana

COAL MEN ON THE JOB . . .

AMHERST COAL CO.: E. R. Loudermilk (left), blacksmith, and G. A. Cooper, outside foreman, Paragon mine, Yolyn, Logan County, W. Va.

been manager of Gar Wood's direct factory truck equipment sales branch in Los Angeles since 1950. Ross Miller has been named sales manager of St. Paul Hydraulic Hoist, Mattoon, Ill. Mr. Miller comes to St. Paul with more than 35 yr experience in the truck equipment field, serving as vice president and general manager of the National Lift Co. prior to his present appointment. H. H. Hippler has been named Gar Wood assistant director of sales and service administration. Former branch division manager since 1949, Mr. Hippler has been with Gar Wood for 30 yr. Also announced by Gar Wood is the opening of two new direct factory truck equipment sales branches, in Tulsa, Okla., and Springfield, Ill., representing another step in Gar Wood's current sales expansion program to increase its market coverage and gain wider distribution for the company's products. Both branches will distribute the complete line of Gar Wood truck equipment and will be managed by D. C. Royce, in Tulsa, and Carroll Merriett, in Springfield. Don L. Herring has been appointed district manager for Gar Wood tractor-equipment sales for the states of Florida, Georgia, Alabama, North and South Carolina and Tennessee, with headquarters in Atlanta, Ga. Previous to his appointment, Mr. Herring was on the sales staff of Square Deal Machinery & Supply Co., Orlando, Fla.

And For Your Information . . .

John A. Roebling's Sons Corp., Trenton, N. J., has named Charles C. Shackford product engineer of the Electrical Wire Div., succeeding B. R. Hubbard, who resigned to accept another position. Following his graduation from Lehigh University in 1935, Mr. Shackford joined the Roebling Corp. as a student engineer in the Electrical Wire Div.

Aeroquip Corp., Jackson, Mich., has appointed Charles W. Sawhill general sales manager of its West Coast subsidiary, Aero-Coupling Corp., Burbank, Calif. Formerly industrial sales manager

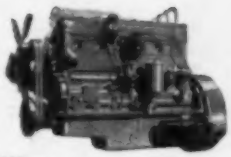
NEW RF-230 60,000 lbs. GVW six-wheeler, one of 25 six-wheel models—all with new maintenance reducing, extra rugged rubber-bushed bogie.

NEW MODELS NEW FEATURES

INTERNATIONAL keeps 'em coming... all the time, to do today's truck jobs better, at lower cost!

INTERNATIONAL continually brings you great new truck features, new all-truck models, new value for your truck dollars, in the world's most complete truck line. INTERNATIONAL follows this policy to give you right now the developments that will help you do your hauling jobs better, cut your costs and boost your profits. Before you make any truck purchase, check all the new developments shown here—then let your INTERNATIONAL Dealer or Branch give you *all* the reasons why an INTERNATIONAL is your best truck buy.

INTERNATIONAL HARVESTER COMPANY • CHICAGO



NEW increased power, with all-new 201-hp Royal Red Diamond 501 engine standard in new high-power-to-weight 220 Series models.

NEW space-saving, high economy, big capacity COE models—3 series, 12 models from 21,000 to 30,000 lbs. GVW—50,000 to 65,000 lbs. GCW. Also available with sleeper cab.

NEW Super Space Saver ROADLINER® conventional truck-tractors that haul all 35-foot trailers in 45-foot limit. GCW, 42,000-65,000 lbs.

NEW factory-installed 50-inch one-man cab that permits balanced, 2-side loading of steel, lumber, pipe and other longer-than-truck materials.

NEW power steering for all models. New light-duty truck features include tubeless tires, optional automatic transmission and overdrive.

NEW multi-stop models with METRO® bodies—14,000 to 16,000 lbs. GVW. 10 other models—5,400 to 11,000 lbs. GVW with METRO and METROETTE bodies—available with new METRO-Matic transmission.

PLUS four-wheel-drive models of 11,000 and 15,000 lbs. GVW—built for lowest cost operation in roughest, toughest terrain.

PLUS factory-installed, Underwriters approved LPG power, available as optional equipment in 54 models from 4,200 to 45,000 lbs. GVW.

PLUS 10 diesel engines for 30 models. The INTERNATIONAL line of 185 basic models offers widest choice of power—30 engines, gasoline, LPG and diesel.

International Harvester Builds McCORMICK® Farm Equipment and FARMALL® Tractors...Motor Trucks...Industrial Power...Refrigerators and Freezers

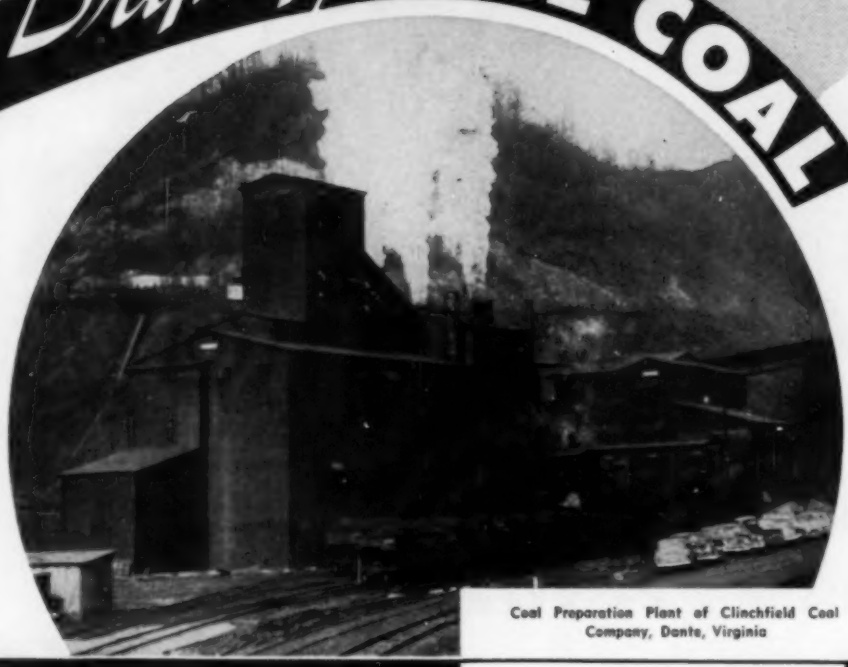
See the season's new TV hit, "The Halls of Ivy," with the Ronald Colmans, Tuesdays, CBS-TV, 8:30 p.m., EST

INTERNATIONAL® TRUCKS

"Standard of the Highway"

Flash Drying FINE COAL

180 TONS PER HOUR



Coal Preparation Plant of Clinchfield Coal Company, Dante, Virginia

C-E RAYMOND SYSTEM

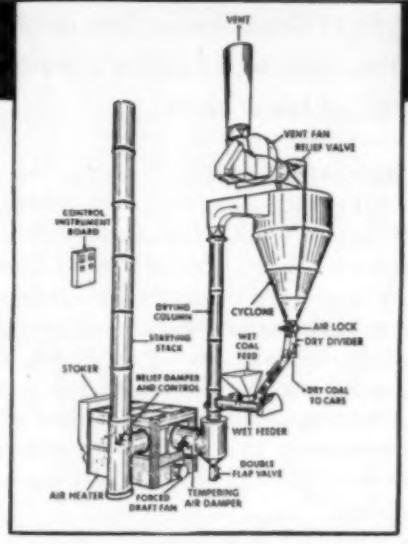
An outstanding installation of the C-E Raymond System of Flash Drying Fine Coal is the three-column unit at the Clinchfield Coal Company Preparation Plant in Dante, Virginia.

This equipment has a design capacity of 180 tons per hour of ¼" x 0 coal. The initial surface moisture ranges from 12% to 14% and this is reduced to 2% final surface moisture. The rated capacity has been greatly exceeded in actual operation.

The smooth, clean, automatic operation with low power consumption and low maintenance costs are advantages which are responsible for the widely increasing use of the C-E Raymond System.

Complete units are available for small and large plants . . . 10 to 80 tons per hour for single drying column . . . and with multiple drying columns connected to one furnace for still higher capacities.

Write for Bulletin FD-51



Typical Flow Sheet of C-E Raymond System of Flash Drying Fine Coal Sizes

COMBUSTION ENGINEERING, INC.

Raymond Division

1315 NORTH BRANCH ST., CHICAGO 22, ILLINOIS

SALES OFFICES IN PRINCIPAL CITIES

4 Mighty Manitowocs produce for Tri-County Fuel Co., Boyer, Penna.

IT's no wonder that strip miners all over the nation are switching to Manitowocs —fleet owners and operators *know* that Manitowocs *produce* more yardage—more profit per shift—day in and day out!

Here's a 4500 "delivering the goods" for Tri-County Fuel Company, Boyer, Penna.—one of four Manitowocs stripping and loading, either as a shovel or dragline.

See Manitowoc—watch it operate—notice how its fast operating cycles, smooth, positive-action torque converter, special design long reaching booms, hi-lift shovels and faster traveling crawler type mounting can mean greater production for *you* on *your* mining operation.

See Manitowoc before you buy your next shovel or dragline—see for yourself why the big swing is to Mighty Manitowoc.

the Torque Converter makes the difference

- **Precise Control—"Fraction of an inch" control by either hand throttle or foot accelerator, without slipping clutches.**
- **Smoother operation—Cushion of oil absorbs jarring impacts which saves cables, clutches and machine assemblies.**
- **Balanced Power-Load — Engine operates at maximum efficiency at all times . . . full engine power under full load, just enough power for light loads . . . assuring economy of operation. Engine cannot stall and develops full "lugging" power. Load requirements and engine horsepower always automatically balanced.**
- **Infinite Speeds—No gears, but all the advantages and none of the disadvantages of automatic, multi-speed transmissions. An infinite number of speeds at your command without shifting, since speeds and power are automatically balanced at all times.**

MANITOWOC

SHOVELS 1-5 YD. Speedcrane CRANES 18-100 TON

FORWARD!

by

LUBRIPLATE LUBRICANTS

The introduction of LUBRIPLATE Lubricants established a new high standard for industrial lubrication. Now, a recently patented improvement in the production of LUBRIPLATE results in even greater lubrication efficiency. Under today's operating costs, reduction of down time, less parts wear and replacements, as well as lower power consumption, far outweigh any differential in the initial cost of LUBRIPLATE Lubricants.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for your free copy of the new and enlarged LUBRIPLATE DATA BOOK—a most valuable treatise on modern lubrication!

LUBRIPLATE DIVISION
Fiske Brothers Refining Co.
Newark 5, N. J. • Toledo 5, Ohio

of Aero-Coupling, Mr. Sawhill will be responsible for industrial and aircraft sales on the West Coast.

Worthington Corp., Harrison, N. J., has named George L. Ziegler, assistant works manager of the Buffalo Works since 1951, manager of parts service for the corporation, with headquarters at Harrison.

The Heil Co., Milwaukee, Wis., has appointed Knoxville Structural Steel Co., Inc., 301 Morelia Ave., N. E., Knoxville, Tenn. a distributor of Heil truck bodies and hydraulic hoists for a part of the state of Tennessee.

The Consolidated Western Steel Div. of United States Steel Corp., Salt Lake City, Utah., has announced plans to construct a steel pipe plant on an 117-acre site adjacent to the Geneva works of U. S. Steel's Columbia-Geneva Steel Div. near Provo, Utah. About 175,000 sq ft will be provided in the main building housing manufacturing equipment.

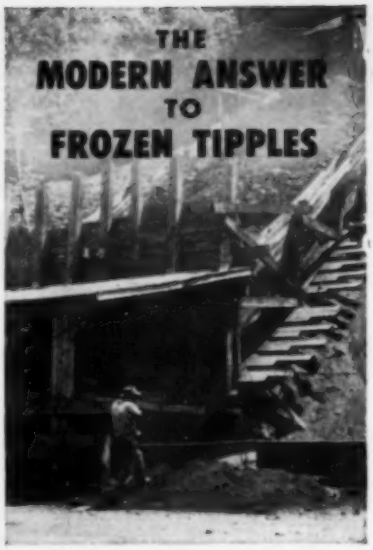
Yardley Plastics Co., Columbus, Ohio, has announced new warehousing service at 565 Western Ave., N. W., Atlanta, Ga., to enable the company to give overnight and pickup service to dealers and distributors in the southern states.

Edgar D. Leon, president, The Gear Grinding Machine Co., and Thomas R. Navin, president, Republic Gear Co., Detroit, have jointly announced that Geargrind has acquired all of the assets of the Republic Gear Co., and its wholly owned subsidiaries, Detroit Bevel Gear Co. and Almetal Universal Joint Co. of Cleveland, Ohio. Although Geargrind will control the operation, the entire executive management team of Republic and its subsidaries will be retained without major changes of policy.

Robertshaw-Fulton Controls Co. Sept. 23 formerly opened a $1,000,000 research center to develop new control devices for home appliances and industry at Irwin, Pa. The 241-ft aluminum and glass building with 31,000 sq ft contains the latest laboratory equipment and special devices for simulating varied conditions required for research and testing projects in the controls field, and also will serve as research and development headquarters for the company's seven manufacturing divisions. Victor Weber, vice president and director of research and development, will make his offices at the new center.

Warren Steam Pump Co., Inc., Warren, Mass., has appointed Frank Young sales-service engineer for its marine and industrial sales departments. Following retirement from the naval service in 1946 with rank of commander, Mr. Young has been in consulting engineering until recently joining Warren Steam Pump.

Bemis Bro. Bag Co., St. Louis Mo., has named S. M. Spencer, formerly supervisor of textile bag sales, assistant manager of the company's St. Louis plant and sales division. Mr. Spencer joined Bemis at St. Louis in 1937 and has since held various sales posts.



INSTANT HEAT
WHEREVER — WHENEVER NEEDED

When cold snags coal as it did in the tipple of a West Virginian mine . . . or freezes machines and men . . . you need heat . . . and you need it fast.

Silent Glow Portable Heat is the answer. Fast . . . clean . . . safe . . . and completely portable, these rugged heaters provide all the heat you need . . . instantly . . . where you need it.

EIGHT MODELS—*A Portable Heater to meet every heating need . . . radiant or forced air . . . from 168,000 to 420,000 BTU per hour. Write for details today.*

SILENT GLOW
Portable
HEAT
ACCESSORY TO MODERN MINING

THE SILENT GLOW OIL BURNER CORP.
848 WINDSOR STREET, HARTFORD 1, CONNECTICUT

World's best trucks... by actual comparison!

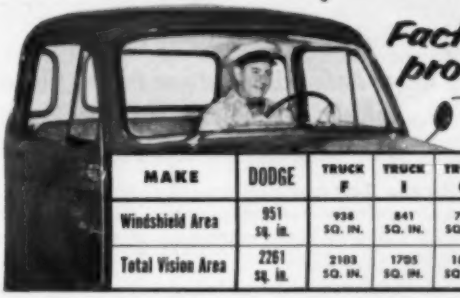
Most powerful low-tonnage truck engine!

	DODGE	TRUCKS F	I	G	C
Max. HP. of leading ½-, ¾-, 1-ton trucks	145-hp.	130-HP.	126-HP.	125-HP.	112-HP.
HP. per cu. in. displacement	.601	.544	.524	.503	.475

Here's proof

New Power-Dome V-8 delivers sensational 145 hp. . . . more than any other low-tonnage truck engine

Best truck visibility!



Facts prove it

MAKE	DODGE	TRUCK F	TRUCK I	TRUCK G	TRUCK C
Windshield Area	951 sq. in.	938 SQ. IN.	841 SQ. IN.	728 SQ. IN.	728 SQ. IN.
Total Vision Area	2261 sq. in.	2103 SQ. IN.	1795 SQ. IN.	1890 SQ. IN.	1890 SQ. IN.

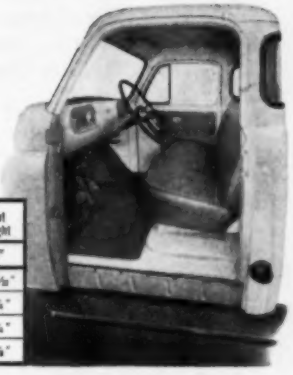
Sharpest turning trucks!

and here's the proof...

Make of ½-ton Pick-Up	No. of ft. for U-Turn
DODGE	**36¾'**
TRUCK F	37½'
TRUCK I	38½'
TRUCK G	41'
TRUCK C	39½'

Roomiest truck cab!

Here's proof!



Make of Truck	Hip-room	Shoulder-room	Seat Height
DODGE	**61¾"**	**58⅜"**	**16"**
TRUCK F	60¾"	56⅛"	15⅛"
TRUCK C	60"	55½"	14¼"
TRUCK G	60"	55½"	14¼"
TRUCK I	58¼"	57"	13⅞"

DODGE "Job-Rated" TRUCKS

ASK US TODAY ABOUT A BETTER DEAL FOR THE MAN AT THE WHEEL!

How Sterling Rock Salt Helps

HUDSON COAL COMPANY

Scranton, Pa.

SELL MORE COAL!

Major Anthracite Producer Proves Dollar Value of Salting Winter Shipments with STERLING ROCK SALT

Because their customers wanted their winter coal to arrive unfrozen and easy to unload quickly—Hudson Coal Company began experimenting with anti-freeze treatments in 1945.

After two years of tests, Hudson has used STERLING ROCK SALT exclusively for the past 7 years—for these five reasons:

- **Costs less.**
- **Handles easier.**
- **Can be stored without loss.**
- **Non-toxic. Harmless to workers' garments.**
- **Dissolves slower. Effective longer.**

SAVES MONEY AT THE MINE, TOO

Hudson also saves dollars and valuable time at the mine, using STERLING ROCK SALT to prevent frozen scales, track switches—to keep roads and tracks open. And for removing ice and snow from platforms and all work areas for efficiency and safety.

Order Sterling Rock Salt NOW . . .
in carloads, bulk or handy 100-lb. bags.

STERLING AUGER-ACTION ROCK SALT

International Salt Company, Inc., Scranton, Pa.

MAIL THIS COUPON TODAY

International Salt Co., Inc., Dept. CA-11, Scranton, Pa.

☐ Please have your representative call.
☐ Please send name of nearest dealer.

*Name*_____

*Company Name*_____

*Street*_____

*City*_____ *Zone*___ *State*_____

CORE DRILLING —anywhere

"We look into the Earth"

PENNSYLVANIA Drilling CO.

DRILLING CONTRACTORS AND MFRS.

1205 Chartiers Ave. **Pittsburgh, Pa.** WAlnut 1-5816

If you are MOVING...

Don't forget to notify us at least one month in advance to insure uninterrupted service to your subscription to COAL AGE.

Please send your change of address together with your old address to:

DIRECTOR of CIRCULATION
COAL AGE, 330 West 42nd Street
New York 36, N. Y.

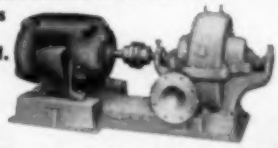
DON'T FORGET TO NOTIFY YOUR POSTMASTER, TOO!

Faithful Performance on Important Jobs

— such as water supply, brine circulation, booster service, white water and overflow, hot well, makeup water, etc., etc.

Capacities to 1,200 G.P.M.

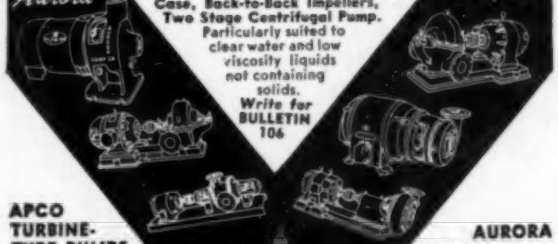
Heads to 460 Ft.



PUMPS "by Aurora"

For Every Purpose

TYPE-AD Aurora Horizontally Split Case, Back-to-Back Impellers, Two Stage Centrifugal Pump. Particularly suited to clear water and low viscosity liquids not containing solids. *Write for* BULLETIN 106



APCO TURBINE-TYPE PUMPS are unbeatable on low capacity, high head duties.

Capacities to 150 G.P.M. Heads to 500 Ft.

AURORA CENTRIFUGAL PUMPS are available in many types and sizes—all noted for their streamline coordination between impellers and shells.

Write for CONDENSED CATALOG "M"

DISTRIBUTORS IN PRINCIPAL CITIES

AURORA Always PUMPS

AURORA PUMP DIVISION

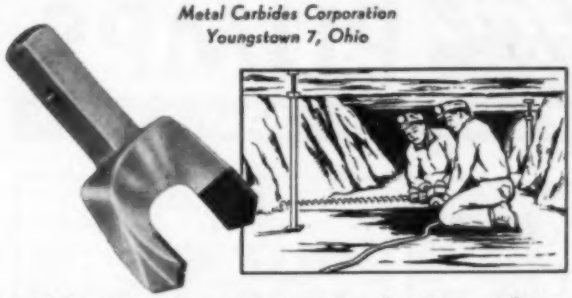
The New York Air Brake Company

92 Loucks Street Aurora, Illinois

SUPERSET CORE BITS

● Mining contractors, ore prospectors, coal operators and construction firms are realizing tremendous savings by taking advantage of our **exclusive fabrication service!** Contractors send us the necessary diamond stones from their own stocks—we hand set them in a super-hard tungsten carbide crown and braze to the threaded steel blank. Hand-set bits assure the proper positioning of each diamond stone to achieve maximum cutting efficiency. The carbide matrix holds the diamond stones until entirely used up. These advantages mean lower drilling costs to you. We can also supply complete core bits or salvage the stones from used bits at nominal cost. Supplied in standard sizes EX, EXE, AX, BX, NX, etc.

Metal Carbides Corporation
Youngstown 7, Ohio



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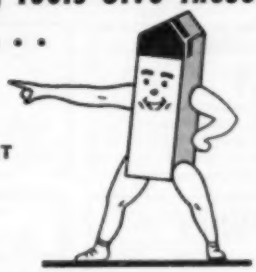

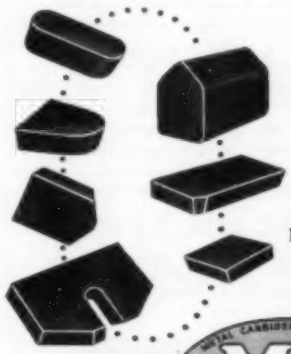

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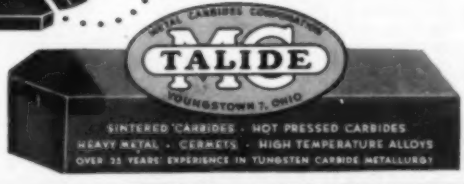
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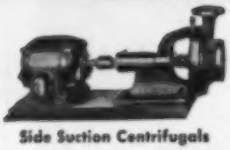

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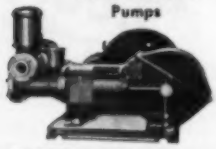

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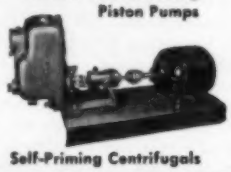

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75	G.E. (Pyranol)	2400/4160	120/240	3
65	G.E.	2300/4000	206/103	3
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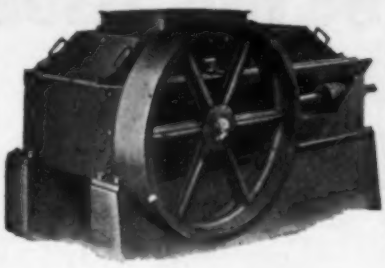

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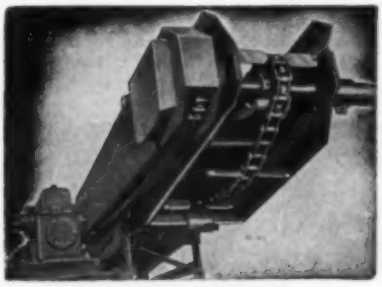
SCRAPER CONVEYORS

1—Link Belt, 50' centers, 12" flights
1—Jeffrey, 75' centers, 9" flights
1—Jeffrey, 67' centers, 30" flights
1—Jeffrey, 70' centers, 30" flights
1—Jeffrey, 72' centers, 30" flights
1—Jeffrey, 88' centers, 36" flights
1—Jeffrey drag, 28' centers, 9" drags
1—Jeffrey drag, 26' centers, 30" drags

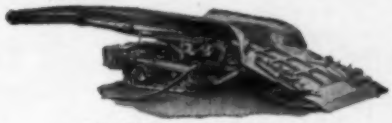
ROTARY DUMPER

1—Card rotary car dumper, 13'x5' platform



ELECTRIC HOISTS

1—11 HP Vulcan #0 single drum
1—20 HP Vulcan single drum
1—22 HP Vulcan double drum
1—25 HP Vulcan single drum
1—30 HP Vulcan single drum
1—37 HP single drum
5—50 HP single drum
2—60 HP single drum
4—100 HP Box single drum
1—112 HP Vulcan single drum
1—145 HP Vulcan single drum
2—150 HP Vulcan single drum
1—375 HP Box Single Drum Hoist, 800 FPM with 375 HP GE Slipring Motor, 575 RPM, complete with controller, grids and magnetic contact panel.
1—600 HP Box Single Drum Hoist, 25,000# Rope Pull, 900 FPM, Hydraulic Post Breaks with 600 HP Westinghouse Slipring Motor, 435 RPM, controls and magnetic contact panel.



LOADERS & CONVEYORS

1—8BU Joy loader
1—61EW Jeffrey elevating chain conveyors
1—61HG Jeffrey chain conveyor, 90'
1—61W Jeffrey chain conveyor, 200'
9—G-20 Goodman shaker conveyors
6—G-15 Goodman shaker conveyors
8—Vulcan shaker conveyors
2—Joy ladel UN-17 shaker conveyors
10—Goodman HA duckbills

MINING MACHINES

2—7B Sullivan super short wall coal cutters
18—CE7 Sullivan coal cutters
1—CR3 Sullivan coal cutter
1—Jeffrey 28A coal cutter
6—Goodman 112-A coal cutter
1—Sullivan CH-11 ironclad shearing machine
1—Jeffrey 29-C Arcwall coal cutter

SCALES

3—100 ton Fairbanks railroad scales
1—100 ton Howe railroad scale
1—125 ton Howe railroad scale
1—5000# Fairbanks Tipple scale with weighing basket
1—5000# Howe Tipple scale

SCREENS

5—3'x5' Tyler "Hummer" electric vibrating screen
1—42"x72" Jeffrey-Traylor electric vibrating screen
1—48"x84" Jeffrey-Traylor electric vibrating screen
1—40"x100" Tyler-Niagara 2 deck shaking screen
2—4'x12' Tyler Ty-rock 3 deck shaking screen
1—2 deck shaking screen, 18'x86"
1—4 deck shaking screen, 32'x84"

PIT CARS

125—60 cu. ft. Card steel coal mine cars 36" ga.
88—66 cu. ft. Card steel coal mine cars 36" ga.

SHUTTLE CARS

2—Joy Shuttle Cars, Model 42DS.

RAIL

We have in stock good relaying rail, 16# to 90# also new 16# to 20# with fittings.

STORAGE BINS

2—50 ton capacity steel bins

CAGES AND HEAD SHEAVES

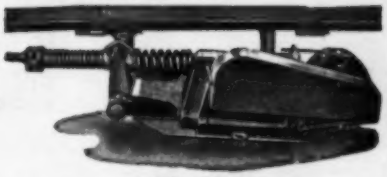
2—Card automatic self-dumping cages, 5'4" x 9'6" platform
2—108" Card bicycle sheave wheels
2—96" wood filled sheaves
2—84" Card bicycle sheave wheels
3—72" bicycle sheave wheels

MINE FANS & BLOWERS

2—8-H Jeffrey 42" Aerodyne fans
1—7' Jeffrey Aerovane 2 stage fan
2—Jeffrey #61 exhaust blowers
7—Jeffrey Aerodyne midget blowers
1—2600 cfm Brown-Fayro exhaust blower
2—3000 cfm Claridge exhaust blowers

PICKING TABLES

1—Link-Belt, 20' centers, 18" pans
1—Card, 41'6" centers, 30" pans
1—Card, 51' centers, 48" pans
1—73' centers, 30" pans
1—64' centers, 48" pans



ELEVATORS

1—Link-Belt, 42' centers, 6"x4" buckets, single chain, complete with steel housing
1—Link-Belt, 36' centers, 18"x8" buckets, double chain
1—12' centers, 14"x7" buckets on belt
1—35' centers, 10"x5" buckets on belt

BELT CONVEYORS

1—Jeffrey 24"x13'
1—Barber-Greene, 24"x66'
1—Barber-Greene, 24"x135'
1—Barber-Grene, 30"x173'

LOCOMOTIVES

1—2 ton Whitcomb, battery, 24" ga.
2—2½-3½ ton Mancha battery, 24" ga.
1—4 ton Westinghouse-Baldwin battery, 24" ga.
1—4 ton Ironton, battery, 36" ga.
2—7 ton G.E. permissible battery, 36" ga.
1—7 ton Atlas, battery, 36" ga.
3—8 ton Ironton battery, 36" ga.
2—8 ton G.E. battery, 36" ga.
2—8 ton Goodman battery, 36" ga.
4—10 ton Atlas battery, 36" ga.
1—3 ton Whitcomb gas engine driven, 24" ga.
1—2½ ton Jeffrey trolley, 36" ga.
1—4½ ton Goodman trolley, 36" ga.
1—5 ton Jeffrey trolley, 36" ga.
1—6 ton Goodman trolley, 36" ga.

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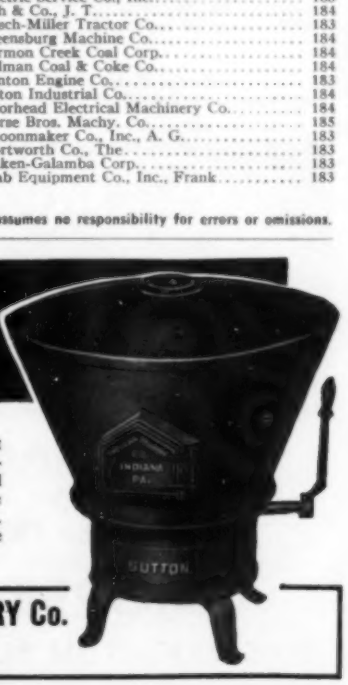

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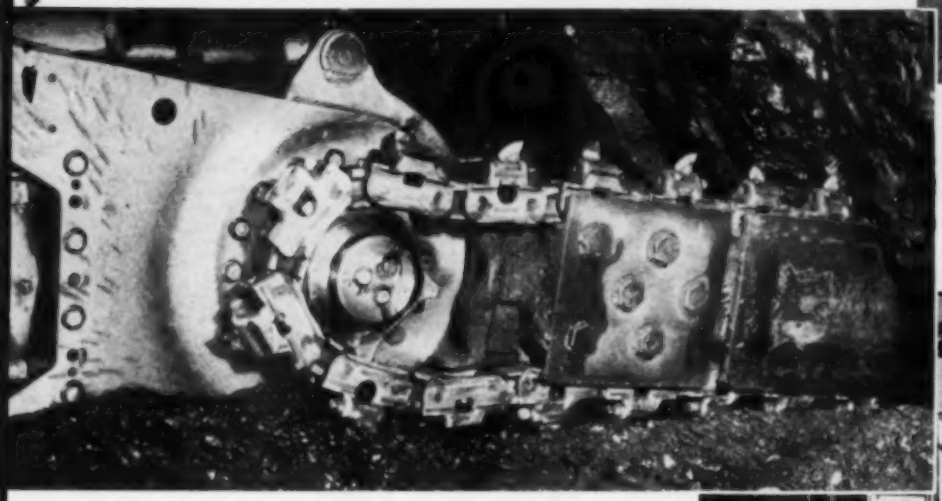
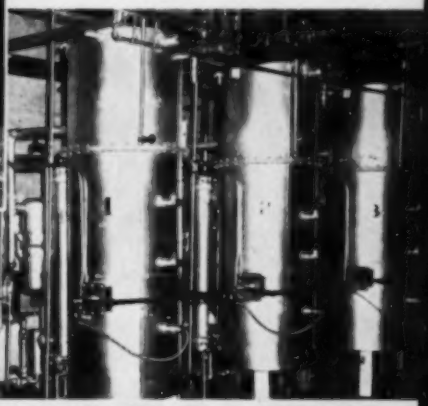
CINCINNATI'S*...

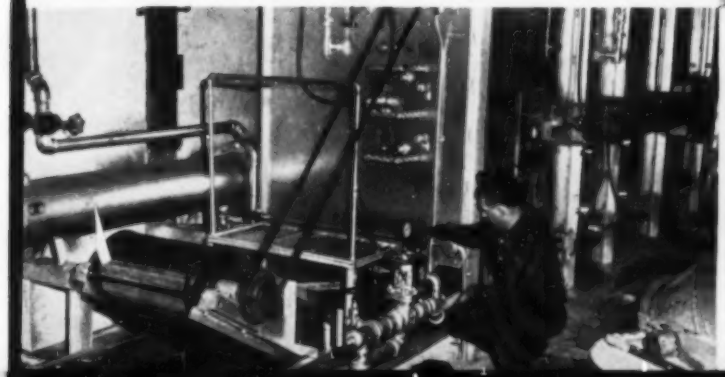
MODERN HEAT TREATING PLANT GUARANTEES DEPENDABLE PRECISION HEAT TREATING FOR ALL CINCINNATI COAL CUTTING EQUIPMENT



ACTION PHOTO: Complete Cincinnati Mine coal cutting installation in one of America's largest coal mines.



OUR emphasis on the importance of heat treating of Cincinnati Cutting Equipment has resulted in our having one of the finest heat treating plants in the country and as a result, we are now doing heat treating for numerous outside companies who demand precision work. Rugged cutting equipment demands not only fine engineering . . . the finest of alloy steels . . . but modern equipment combined with years of experience in heat treating to get the most out of these fine metals. In that respect, our heat treating department excels. Two of our top men are recognized leaders in the field of heat treating . . . with over three quarters of a century experience between them. There's no finer coal cutting equipment than CINCINNATI . . . may we be of service?



the **CINCINNATI*** **MINE MACHINERY CO.**
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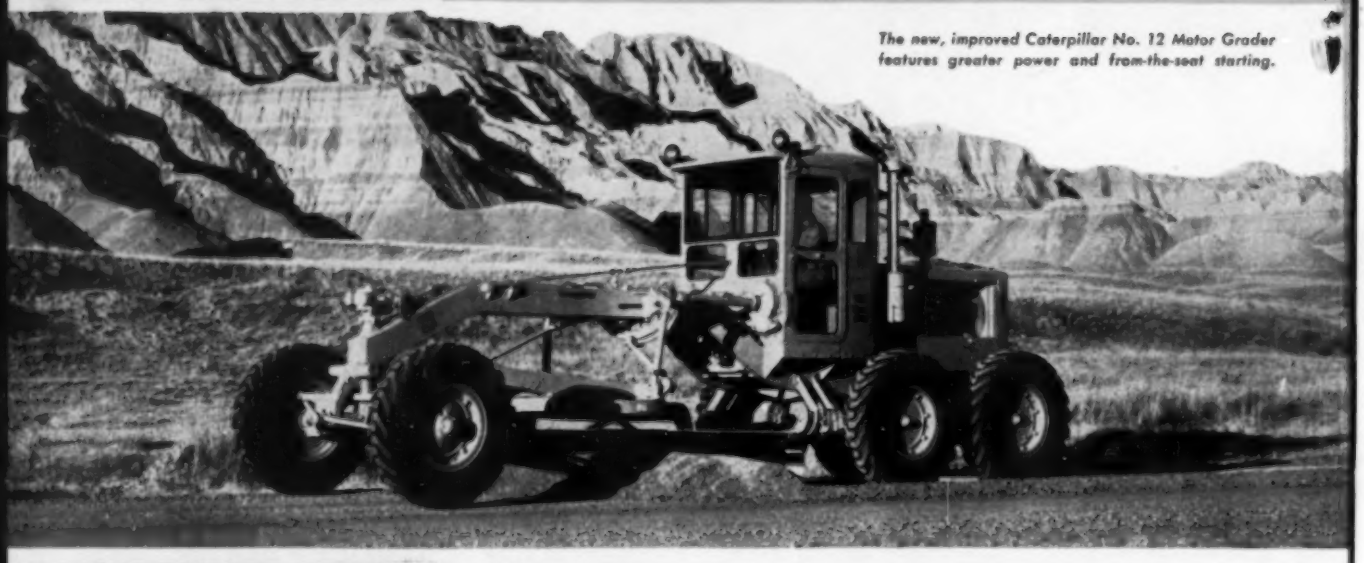
115 HORSEPOWER

A 15% INCREASE IN POWER

NO INCREASE IN PRICE



The new, improved Caterpillar No. 12 Motor Grader features greater power and from-the-seat starting.

NEW

in BOTH No. 12 and No. 112

One-lever from-the-seat starting

Accelerator-decelerator pedals

Improved hand throttle

Redesigned instrument panel in easy-to-read location

No increase in price

Now there's a new high in performance in CAT* Diesel No. 12 and No. 112 Motor Graders. In keeping with Caterpillar's policy of constant product improvement, both these rugged machines incorporate new features that increase their profit-making capacity. The new No. 12 packs more power, 115 HP—and has faster reverse speeds—low reverse, 4 m.p.h.; high reverse, 6.3 m.p.h. For durability, the capacity of the transmission and clutch has been increased to match the greater horsepower. Other improvements, standard in both the No. 12 and No. 112, are: convenient one-lever from-the-seat starting and the accelerator-decelerator pedals that permit changing speeds without changing throttle setting.

With these and other new features, you can figure on even *more* work at lower cost from the No. 12 and No. 112. Along with the No. 212, they are the only motor graders whose major components are built entirely by one manufacturer and serviced by one organization. Their performance record is unmatched—more than 99% ever built are still in use. Ask your nearby Caterpillar Dealer to show you how these machines can step up production and profits for you!

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Jamison's modern No. 9 mine in West Virginia makes full use of mechanized coal haulage. And when it came to selecting the conveyor belting, the mine officials specified U. S. Rubber's Ustex®-Nylon Belt for slope haulage. Two great textiles are combined in this belt: "U. S." patented Ustex for strength, Nylon for flexibility and troughability. The great strength of this belt means that it can handle longer centers, higher lifts.

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How to reduce coal drying costs

EXHAUST AIR
2
Material discharged from pans falls back to loading zone, clearing the ascending material.
Louvre pan action spreads material in thin layers, directs air currents through moving curtain of material. You get maximum heat transfer, high operating efficiency.
3
When material, after several passes through the air stream, has traveled to the far side, it is discharged by the second screw conveyor.
HEATED AIR INLET
1
Screw conveyor delivers wet coal to pans at near side.

LINK-BELT Multi-Louvre Dryer requires as little as one-half the horsepower used by other dryers

IN reducing the moisture of any size coal between minus 28-mesh and 1½-inch pieces, the Multi-Louvre Dryer is fast, safe, low-cost. Its unique design minimizes air pressure drop — *cuts power requirements as much as 50%*. And this low air velocity also reduces degradation and dusting . . . makes effective dust collection easy.

What's more, the low exhaust air temperature assures greater heat utilization . . . also makes possible lower air inlet temperatures for increased output. Simple, *automatic* controls permit varying the feed rate, prevent heat damage to the load in event of any stoppage.

To find out how you can dry as high as 150 tons of coal per hour with a Multi-Louvre Dryer, call your nearby Link-Belt office. Chances are Link-Belt's broad coal preparation experience can give you a more marketable product.

13,234

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